

Malaria Control Manual

Introduction



Table Of Contents

Malaria Control Manual	1
Introduction.....	1
Table Of Contents.....	2
Who are these guidelines for?	5
Malaria – why get involved?	6
Part I	9
Background Information	9
What is malaria?.....	10
Malaria control.....	21
Monitoring And Evaluation.....	37
Part II	39
Intervention	39
Oxfam’s role and collaboration.....	40
Oxfam Malaria Control Strategy	42
Specialist Support.....	46

Assessment	47
Assessment Methods.....	53
Analysis.....	59
Planning	61
Implementation	67
Baseline Data	76
Information, Education & Communication:.....	79
Monitoring & Evaluation	89
Part III	94
Resources	94
Contacts.....	95
GLOSSARY	97
Bibliography.....	101
Potential Partners.....	103
EXAMPLE MEMORANDUM OF UNDERSTANDING	105
SIGNS AND SYMPTOMS	107
Focus Group Discussion Framework	109
Terms of Reference	111

MALARIA QUIZ QUESTIONS 115

ITN Monitoring Form 118

LESSONS ON MALARIA 119

Malaria Songs 144

STORY ABOUT MALARIA 147

MALARIA 149

**Malaria Advice for Overseas Travellers (from staff health
guidelines) 154**

Example Malaria Budget 161

Who are these guidelines for?

This book is meant for all Oxfam staff who may be involved in initiating a malaria control project in humanitarian situations specifically although much of the background information will be useful for longer term programmes. Knowledge of malaria control is important for Public Health Promoters, Water and Sanitation Engineers and Project Co-ordinators and Managers in order to facilitate decision-making and project formulation.

Public Health Promoters and Water and Sanitation engineers especially will need guidance on how to implement such a project and what lessons have been learnt from previous malaria control projects. They will also need to be aware of how to plan an effective vector control project, which targets malaria vectors.

Non technical managers will need to have a reference book that can guide them in deciding whether intervention is required or not. It will also help those seeking funding or writing proposals for malaria control projects and enable them to present clear arguments for intervention.

Malaria – why get involved?

Malaria is a preventable and curable disease and yet more than one million people die from it each year. It is a disease that significantly affects the poor who suffer economic, social and educational deprivation. Malaria is also a disease that flourishes in conditions of crisis and population displacement and is therefore of particular concern to those involved in addressing public health in emergencies. The following factors contribute to its spread during humanitarian emergencies:

- **The breakdown of health services and of malaria control programmes**
- **Movements of non-immune people or concentration of people in high risk areas for malaria**
- **The weakened nutritional state of the displaced population**
- **Environmental deterioration that encourages vector breeding**
- **Limited access to populations at risk**
- **Environmental factors such as flooding**

Two billion people in over 100 countries live in areas where malaria is present (40% of the world's population). Malaria is accountable for between 1.5 and 2.7 million deaths worldwide each year and **at least 30% of all malaria deaths take place in complex emergencies.**

Most malaria related deaths occur in children under five years of age. In Sub Saharan Africa one in ten deaths of children under 12 months of age and one in four deaths of children between 1 and 4 years of age are caused by malaria. Some parts of the world are also experiencing a resurgence of malaria and malaria has even been recorded in areas where it was previously unknown.

In the past it has been the policy of many donors funding humanitarian interventions not to get involved in addressing diseases that are endemic in a country but only those that are likely to cause severe epidemics. It has become increasingly clear however, that patterns of malaria transmission are changing and that complex emergencies provide conditions that enhance the spread of malaria and make epidemics more likely. In addition the number of natural disasters, especially flooding, is on the increase, creating ideal conditions for vector breeding.

High mortality rates due to any cause demand humanitarian intervention and malaria epidemics are no exception. However, even in the absence of an epidemic, an opportunity to address the increasingly significant problem of endemic malaria should not be ignored by agencies involved in humanitarian emergencies. Any intervention must however, be based on reliable background information and current evidence of effectiveness.

Part I

Introduction

Malaria – why get
involved?

Part I

Background Information

What is malaria?

Malaria is a complex disease. Its severity is a function of the interaction between the parasite, the *Anopheles* mosquito vector, the human host and the environment. The risk of malaria infection is determined by the number of vectors, their survival rate, the incubation rate for both the vector and the parasite and the probability of the vector feeding off a human host. These parameters are directly influenced by meteorological variables such as rainfall, temperature and humidity that give rise to differences in stability of disease transmission and seasonal variations in disease incidence. Behavioural traits, genetic variation and immune status in the human population will also influence the degree of exposure and the disease outcome.

The Vector: anopheles mosquito

There are over 3,000 species of mosquito of which approximately 100 are vectors of human disease. Disease is transmitted when the female of the species takes a blood feed in order to provide nourishment for the development of her eggs. The female *anopheles* mosquito is responsible for transmitting malaria but different species such as *aedes* and *culex* mosquitoes transmit other diseases such as yellow fever, dengue and filariasis. Some anopheles mosquitoes may also transmit filariasis.

Anopheles mosquitoes usually bite from dusk to dawn although in some situations they will bite earlier than this. In many localities the principle vectors of malaria are late night biters and the older mosquitoes (more likely to be infected) are often found to be biting between 12am to 4am. Different species of anopheles however, may have different peak biting times, preferences (animals or humans) and different resting habits (indoor or outdoors) and these factors will influence the choice of control methods. Indoor resting is most common in dry or windy areas where safe, outdoor resting sites are scarce.

The table on page 65 provides details of the common vectors and behaviour.

Anopheles mosquitoes breed in numerous different water habitats from shaded ponds and pools to hoof prints and tyre tracks. They tend to prefer water that is not too polluted but some *Anopheles gambiae* species have been shown to breed in stagnant drains. Artificial containers such as pots or tanks are usually only suitable breeding sites for *aedes* vectors. The exception to this is *An. stephensi* in South West Asia.

The female mosquito lays her eggs on the water and these subsequently develop into larvae and then into pupae. The pupa finally hatches to produce a mosquito. This process can take between 7-16 days but is influenced by humidity and temperature – the higher the temperature and humidity the more rapid the life cycle. Digestion of the blood meal and simultaneous development of the eggs takes about two to three days during which time the mosquito does not usually bite.

Breeding Cycle of the Female Anopheles Mosquito

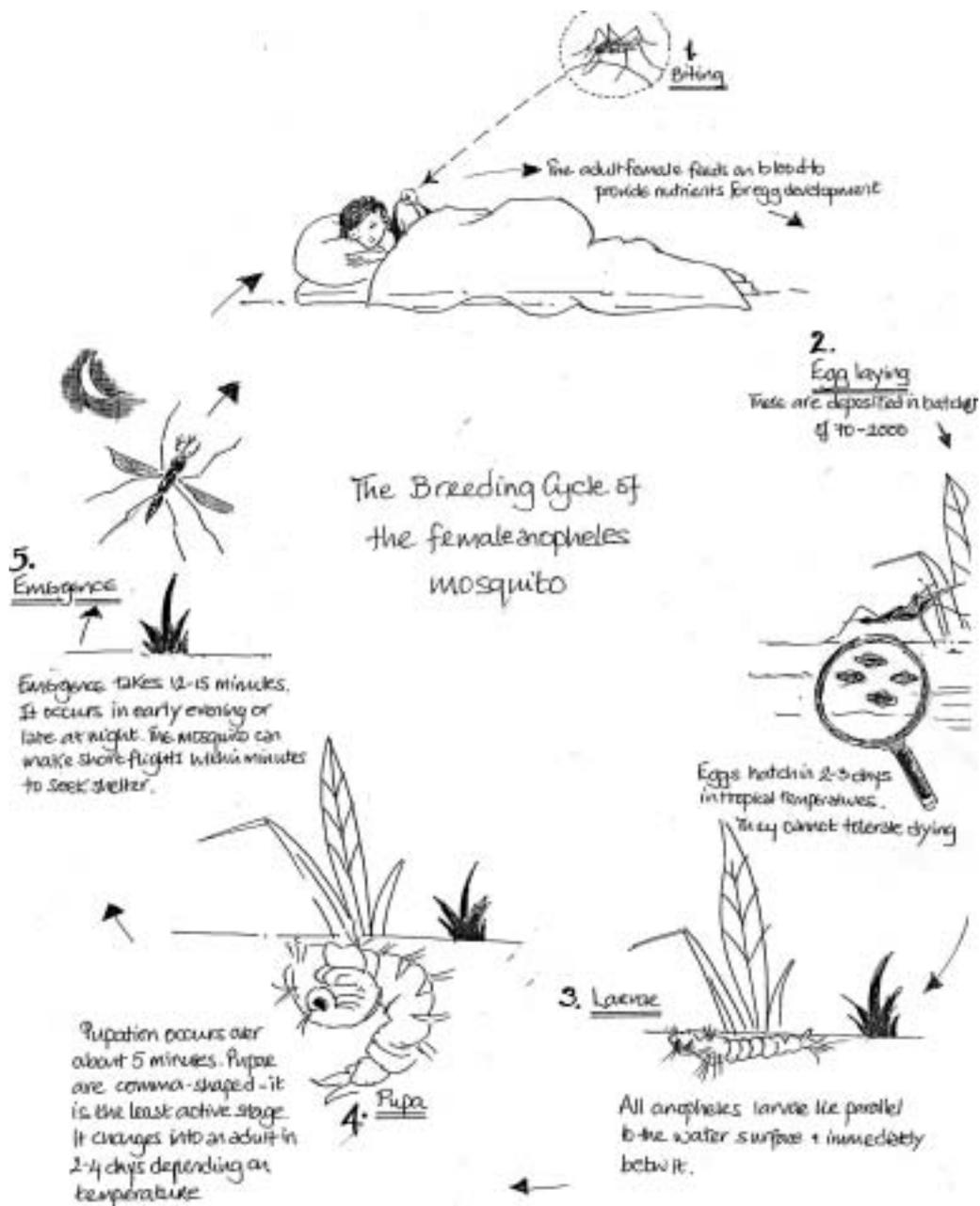


Table of common vectors and preferences

Vector & Geographical area	Breeding Places	Biting Habits	Resting Habitat
<p><i>An. gambiae</i> (<i>An. gambiae</i> complex also used to refer to six similar species including <i>arabiensis</i> and <i>melas</i>)</p> <p>Sub Saharan Africa (e.g. DRC, Tanzania, Sierra Leone)</p>	<p>Mainly temporary habitats such as pools, puddles, hoof prints, borrow pits but also in rice fields. Stagnant water and irrigation sites</p>	<p>Anthropophilic (prefers to bite humans). Exophagic (bites outdoors) and endophagic (bites indoors). Preference for nocturnal feeding</p>	<p>Predominantly endophilic (rests indoors after feeding) but also exhibits partial exophily (rests outdoors after feeding)</p>
<p><i>An. funestus</i></p> <p>Sub Saharan Africa (e.g. Ethiopia)</p>	<p>Swamps, marshes, edges of streams, rivers, ditches and other stagnant waters especially along the coastline. Also irrigation sites. Prefers shaded habitats</p>	<p>Predominantly anthropophilic but also an amount of zoophily (prefers to bite animals). Exophagic and endophagic. Preference for nocturnal feeding.</p>	<p>Predominantly endophilic</p>
<p><i>An. arabiensis</i></p> <p>Sub Saharan Africa (e.g. Ethiopian Highlands))</p>	<p>Breeds in swamps, marshes, and edges of streams, rivers, and ditches. Prefers sunlit habitats</p>	<p>May be both anthropophilic and zoophilic but shows a greater tendency towards zoophily. May be both exophagic and endophagic</p>	<p>Greater tendency towards exophily but may also be endophilic.</p>
<p><i>An. melas</i></p> <p>Sub Saharan Africa</p>	<p>A salt water breeder, occurs along coastal areas. Common in lagoons and mangrove swamps. Heaviest breeding takes place in areas colonised by the black mangrove</p>	<p>Anthropophilic; may show some zoophily in some areas. Exophagic and endophagic</p>	<p>Predominantly endophilic – occasionally exophilic</p>
<p><i>An. pharoensis</i></p> <p>Sub Saharan Africa (e.g. Egypt)</p>	<p>Prefers marshes, swamps, rice fields and ponds,</p>	<p>Anthropophilic and zoophilic, endophagic and</p>	<p>Predominantly endophilic</p>

Africa & North Africa and Middle East	especially those with an abundance of vegetation	exophagic	
<i>An. stephensi</i> Indian Sub continent, North Africa & Middle East (e.g. Afghanistan/ Pakistan)	Breeds in man made habitats associated with towns (cisterns, wells, gutters, water storage jars and containers), fresh or brackish waters and has been found even in polluted waters, in rural areas breeds in grassy pools alongside rivers	Anthropophilic, endophagic and exophagic	Predominantly endophilic
<i>An. minimus</i> (includes <i>flavirostris</i>) Indian Sub continent, South East Asia	Breeds in flowing waters such as foothill streams and irrigation ditches, also rice fields and borrow pits, prefers shaded areas	Mainly anthropophilic but also feeds on domestic animals, predominantly endophagic	Predominantly endophilic
<i>An. dirus</i> (<i>An. leucosphyrus</i> group) Indonesia	Muddy and shaded forest pools, hoof prints, vehicle ruts	Anthropophilic and zoophilic. Predominantly exophagic	Exophilic
<i>An. darlingi</i> Mexico & Central America, South America	Fresh water marshes, lagoons, rice fields, swamps, lakes, edges of streams especially with vegetation, shaded habitats	Predominantly anthropophilic and endophagic	Endophilic

The Parasite: Plasmodium

Malaria is caused by a parasite known as Plasmodium that is carried by the mosquito. There are four different species of Plasmodium that infect human beings, each with different incubation times:

Plasmodium falciparum 9 – 14 days incubation

Plasmodium vivax 12 – 17 days incubation

Plasmodium ovale 12 –17 days incubation

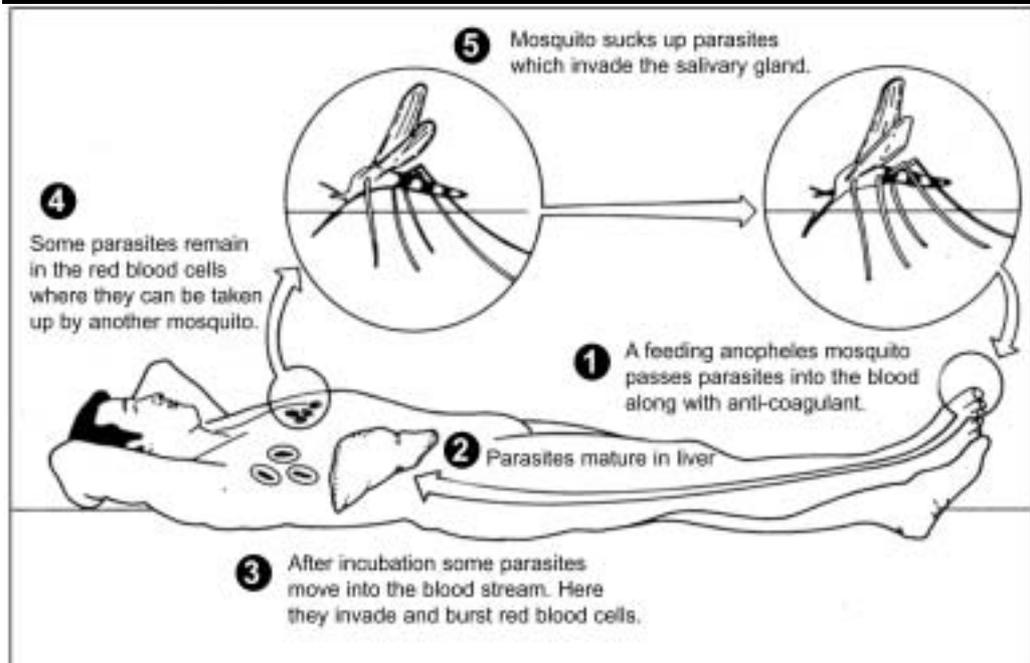
Plasmodium malariae 18 – 40 days incubation

Plasmodium falciparum is the most dangerous of the malaria parasites. It causes 'malignant' or cerebral malaria that can quickly progress to unconsciousness and death.

Untreated or poorly treated infections can cause recurring fevers and are communicable from several months to two years (*P.falciparum*) and up to fifty years (*P.malariae*).

The female anopheles will usually only feed once in a night, however if she is disturbed she will continue feeding until she has sufficient blood for the nourishment of her eggs. This may then be from more than one host. Following ingestion of Plasmodium infected blood, the parasite undergoes various stages of reproduction and development within the mosquito. The parasite will then migrate to the salivary glands of the mosquito and once she bites another host, the parasite will be transmitted. As the female mosquito feeds, saliva, containing Plasmodium is injected as an anticoagulant and the host becomes infected. The extrinsic development of the parasite in the mosquito takes between ten to fourteen days.

Transmission cycle



Signs and Symptoms of Malaria

The main symptom of malaria is fever, caused by the simultaneous rupturing of red blood cells following large-scale parasite multiplication. The fever is often accompanied by chills and sweating. Other symptoms may be headache and joint pains. Jaundice, anaemia or diarrhoea may also be signs of malaria. Severe malaria is usually characterised by coma, delirium and convulsions in addition to the previous signs and symptoms. A list of signs and symptoms for complicated and uncomplicated malaria is provided in the appendix.

The anaemia caused by repeated malarial infections can often cause chronic anaemia that may make the individual more susceptible to other infections and even to death. In addition infections contracted during pregnancy can cause low birth weight and a greater tendency to infection in childhood. It is also common for children to present with both malaria and another infection such as pneumonia.

A definitive diagnosis of malaria can only be made by examination of a blood sample. This is a relatively straightforward procedure requiring a finger prick of blood. However, microscopy facilities are needed to examine the blood slide and these are often not available. In many highly endemic areas a large proportion of the population may have parasites in their blood but no symptoms of malaria, making diagnosis difficult even if a blood sample is taken. Given the seriousness of the disease however, it is accepted as appropriate in most endemic countries to treat all cases of fever even though only a percentage of them may actually be confirmed as malaria. Typhoid, meningitis and pneumonia are often wrongly diagnosed as malaria on clinical examination alone.

Treatment

The first choice of treatment (often referred to as 'first line') in many countries in Sub-Saharan Africa remains chloroquine despite increasing resistance of *P. falciparum* to the drug. Fansidar is the second drug of choice for treatment (2nd line) in Sub-Saharan Africa. In Asia where there is multiple drug resistance the first line treatment will vary.

Quinine is used to treat complicated malaria but is often given inappropriately by injection to treat simple malaria. Quinine is often given in combination with another drug, usually doxycycline or tetracycline, to ensure a high cure rate, although neither doxycycline nor tetracycline is suitable for pregnant women or children under eight years old.

Interest has recently focused on artemisinin drugs that are rapid acting, effective against all strains of *p. falciparum* and *p. vivax* and are well tolerated. Artemisinin is derived from a Chinese herbal remedy used for thousands of

years to treat fever. There are concerns that its unregulated use could lead to parasite resistance but as a result of market pressure, the drug is available in the private sector in most malaria endemic countries of the world.

Drug combinations for multidrug resistant malaria are being developed by the private sector: atovaquone+proguanil (now registered) and artemether+benflumetol (yet to be registered).

The prophylactic drug of choice for pregnant women remains chloroquine in Sub-Saharan Africa but in some countries this is supplemented with Proguanil. Ensuring patient compliance with this drug is difficult as it is given on a daily basis.

Suggested drugs that may be used for prophylaxis for those with no immunity is given in the resource section. Some drugs may cause side effects and information should be available to patients on these. A table of common treatment regimes is provided below.

Common Treatment Regimes & Possible Side Effects

Generic Name	Usual Content per tablet	Adult Dose	Possible Side Effects
Chloroquine	100 or 150mg (base)	600mg 1 st and 2 nd day 300mg 3 rd day	Gastro intestinal disturbances, headache, visual disturbances, depigmentation or loss of hair, skin reactions
Sulfadoxine/pyrimethamine	500mg + 25mg	1500mg + 75mg (3 tablets in one dose)	Blood disorder, rashes, insomnia,
Sulfalene/pyrimethamine	250mg (base)	1500mg + 75mg (3 tablets in one dose)	Blood disorder, rashes, insomnia
Mefloquine	250mg base	1000mg or 15mg/kg of body weight (whichever is lower in one dose) or 1000mg initially + 500mg 6-8 hours later	Diarrhoea, abdominal pain, nausea, vomiting, loss of balance, headache, sleep disorders, anxiety, depression, panic attacks, overt psychosis
Quinine	300mg (salt)	10mg/kg of body weight 3 times/day for	Tinnitus, headache, skin flushes, nausea, visual disturbances, confusion, blood

		7 days	disorders
Quinine + tetracycline			Tinnitus,, headache, skin flushes, nausea, visual disturbances, confusion, blood disorders
Halofantrine*	250mg (base)	500mg + 500mg 6 hours later + 500 mg 6 hours later	Diarrhoea, abdominal pain, nausea, vomiting, skin rashes, ventricular arrhythmias
Artesunate	50mg	2mg/kg of body weight/day for 5 days with a double (divided) dose on the first day	Headache, nausea, abdominal pain, vomiting, occasional diarrhoea
Artemisinin	250mg	15mg/kg of body weight/day for 5 days with a double (divided) dose on the first day	Headache, nausea, abdominal pain, vomiting, occasional diarrhoea

* Halofantrine can cause serious cardiac arrhythmias and Oxfam staff health does not recommend its use. It is frequently available on the private market in many countries.

Vaccine Development

In the last decade, considerable progress has been made in the search for a malaria vaccine. An effective vaccine would constitute a powerful addition to malaria control. More than a dozen candidate vaccines are currently in development and some of them are undergoing clinical trials.

Vaccines for malaria are being developed at a global level and clinical trials are ongoing in USA, Colombia, Switzerland, Australia, Papua New Guinea, Gambia and Tanzania. A cost -effective vaccine must be capable of being incorporated into appropriate health delivery programmes, and must provide a sufficient duration of immunity. At present, it is difficult to predict when such a vaccine will become available but estimates suggest that one may be available within the next 15 years.

Malaria Eradication and Control

In the 1950's efforts were directed at the eradication of malaria following successes in Europe and other countries such as Singapore. The key to eradication was believed to be the use of insecticides and this was emphasised

at the expense of a more holistic approach to control. Whilst eradication has been achieved in many wealthier countries such as the USA, Singapore, conditions prevailing in sub Saharan Africa especially have failed to make eradication a reality. WHO and the Roll Back Malaria campaign now focus on more modest goals of malaria control and the prevention of unnecessary deaths due to malaria.

Malaria and Pregnancy

Malaria in pregnancy is a risk to both mother and baby. It contributes to maternal and neonatal mortality, infant anaemia, maternal anaemia and low birth weight babies, who are more likely to die. Pregnancy reduces a woman's immunity to malaria, making her more susceptible to severe malaria than other adults. Treatment of acute malaria is also more complicated in pregnancy. Even if an infected mother does not have a fever, the baby is still at risk. Protecting pregnant women is therefore a priority.

Pregnant women who are also HIV positive have a higher prevalence and density of malaria parasites in their blood than HIV negative women. Placental parasitaemia increases the risk of death among infants of HIV positive pregnant women. Recent research has also shown that malaria infection in the placenta can increase the risk of HIV being transmitted from mother to baby.

Two treatment doses of sulfadoxine pyremethamine (SP) given to all pregnant women (whether they have symptoms or not) has recently been found to significantly reduce the negative consequences of malaria in pregnancy. This approach is known as Intermittent Presumptive Treatment (IPT). A recent survey in Malawi found that 75% of women had received at least one dose and 30% at least two doses of SP during pregnancy. The women receiving SP in pregnancy had significantly lower rates of placental infection and low birth weight babies. The rates of maternal anaemia were also reduced.

Malaria and Malnutrition

The link between malaria and malnutrition appears complex and the existing research does not yet answer all the questions about the interaction between these two factors. There is currently renewed interest in researching the link between malaria and micronutrients. Several research papers seem to provide evidence that well nourished children have more severe malaria compared to malnourished children and the existence of severe anaemia in malnourished children is offered as an explanation for this. Other papers however, have demonstrated that stunting but not wasting may provide a protective factor for malaria.

Whilst it has been demonstrated that the incidence of malaria increases concomitantly with an improvement in nutrition and access to food in the aftermath of a famine, there is no evidence to prove a causal link between

these two factors. The explanation for this increase may rest in the coincidental increase in rainfall and breeding sites.

Malaria and Floods

There is much current debate about the impact of floods on public health. Recent research on the health impact of natural disasters related to the El Nino phenomenon showed marked changes in the incidence of malaria in parallel with extreme weather conditions associated with El Nino. The complex interplay between all the factors governing malaria incidence however, must be taken into account in order to explain the rises in incidence. Thus changes in the ecology of the mosquito habitat, increased exposure to mosquitoes (e.g. because shelter had been destroyed) and disruption to malaria control services may all have a role to play in explaining the increase in incidence and there does not appear to be a simple correlation between floods and increased incidence of malaria.

Epidemics

An epidemic is described as an unusual increase in the incidence of disease compared to normal seasonal variations. The following principle categories of epidemic should be distinguished (adapted from Najera 1996: Malaria Control amongst refugees and displaced populations WHO: Geneva):

Epidemic Type	Cause	Government or Agency Response
1. Epidemics resulting from an abnormal increase in disease transmission in non-endemic areas or areas of low endemicity,	short-lived increases in vector density as a result of high rainfall or floods increased vector survival following periods of favourable temperature or humidity (e.g. Ethiopian highlands) or movement of infected groups into area	Usually intensive but short transmission – control measures generally applied when epidemic subsiding so ineffective. Can often be predicted so should be possible to prevent earlier since meteorological abnormalities generally follow quasi regular periodicity (5 to 10 years, in some areas longer). Ensure extra availability of drugs and possibly prophylaxis for those at risk.
2. Epidemic outbreaks resulting from increased arrival of non-immunes	Large population movements of non –immunes to areas of high endemicity (e.g. Burundi refugees in Tanzania)	Ensure facilities for diagnosis and treatment, community mobilisation and education, source reduction where practical, further assessment to determine if ITNs or residual spraying suitable intervention
3. Epidemic resurgence of transmission in endemic areas	Vector control or chemoprophylaxis has succeeded in reducing malaria incidence to levels below the ecological potential of the area but control measures have suddenly been discontinued (e.g. East Timor)	Ensure facilities for diagnosis and treatment, community mobilisation and education, source reduction where practical, further assessment to determine if ITNs or residual spraying suitable intervention
4. Epidemics reflecting a new high endemic potential as a result of lasting modifications to environment	Agricultural expansion in potentially malarious but previously uncolonised areas (e.g. colonisation of Amani highlands in Tanzania)	Ensure necessary facilities for diagnosis and treatment, vector control instigated prior to movement of people

Malaria control is an organised attempt to carry out appropriate anti malaria measures to achieve the best possible improvement in the health of any population affected by malaria or exposed to an increased risk of its resurgence.

Attempts to control malaria have worked in many areas of Europe and the Former Soviet Union but most attempts to control the disease in Africa have failed for a number of reasons amongst which is a lack of resources and a limited 'vertical' approach to control which focused mainly on vector control and the use of insecticides. Mosquitoes have also become increasingly resistant to insecticides such as DDT and the malaria parasite has developed increasing resistance to standard drug treatments such as chloroquine. **Rather than continue to focus on the goal of eradication, WHO now aims to prevent mortality and limit excess morbidity.**

Response Options

The World Health Organisation has defined four key elements of malaria control:

- **Early diagnosis and treatment**
- **Prevention including vector control**
- **Early detection, containment and prevention of epidemics**
- **Strengthening national capacity for malaria research and monitoring.**

The following table details potential interventions and when they can be used. Early diagnosis, treatment and community education are the basic responses that should be included in all programmes. Usually a combination of responses is required for optimal control.

Potential Responses			
Response Option	Method	Suitability for Oxfam	Drawbacks
Early Diagnosis & Treatment (may include active case finding during	Ensure access to clinics and appropriate treatment and	Oxfam does not usually provide clinical care in emergency settings.	Access may be compromised through insecurity, payment for drugs

high risk situations)	raise awareness of importance of seeking treatment early, community members or outreach workers may be needed to identify cases early and refer,	All programmes should try to ensure that adequate facilities are available, lobbying other agencies or the MoH or providing minimal support are possible areas of intervention	is often required meaning poorest may not have access, lack of supplies of essential drugs
Community education and mobilisation*	Working in partnership with communities to identify what actions they can take to control malaria, raising awareness through participatory learning	All programmes but must ensure adequate capacity to address other high risk issues	Access may be compromised through insecurity
Social Marketing	Use of marketing principles to price, position and promote sale/acceptance of bednets especially	Some of principles of social marketing may be used to inform approach to mobilisation but may not be sufficient time available	Extensive formative research required but work with communities may feed into longer term programme
Residual house spraying	Spray inside walls with insecticide to kill resting mosquitoes	May be suitable. Effective only where indoor resting anopheles, high coverage needed,	Requires well-trained staff, reliable equipment and financial support. May cause environmental pollution (although this must be weighed against the prevention of excess mortality)
Insecticide treated nets, clothing and bedding	Polyester nets dipped in permethrin or lambda-cyhalothrin every six months, other materials such as shawls and	May be suitable. Effective only if mosquitoes bite after people go to bed (young children and babies may go to bed early)	May be easily damaged in camp situation, retreatment necessary every six months

	blankets have also shown promising results: prevent man-vector contact and may initially kill mosquitoes resting on net		
Chemoprophylaxis	Provision of prophylaxis to at risk groups	Often given as routine antenatal care – provision of drugs (short term) may be feasible, may be possible to distribute prophylaxis to at risk groups if no other agencies have the capacity	Effectiveness of chloroquine prophylaxis controversial, access to at risk population required
Source reduction	Identifying and destroying breeding sites, ensuring adequate drainage	May be suitable. Requires mass mobilisation and commitment to be effective, most effective in densely populated areas where transmission is not intense but important long term measure and education at least should introduce this at a household level	Long term measure, may not be possible to achieve impact in short term time frame. Little success in trying to control <i>an. gambiae</i> using this method
Larviciding: chemical	Use of chemicals to kill larvae or prevent them from developing	Specific problem breeding sites such as swamps – cannot be used in rice paddies (see below)	Not feasible in many areas due to large number and scattered nature of breeding sites, larvicides may be dangerous to wildlife
Larviciding: biological	Use of larvae predators such as fish or biological larvicides such as <i>Bacillus thuringiensis</i> (Bt H-14)	Medium to longer term programmes if suitable fish can be bred quickly and facilities available. Bt H-14 not toxic to animals or humans	Similar to above. Bt H-14 is expensive
Zooprophylaxis	Separation of humans and	Has been successful in Afghan refugee camps	May be difficult to apply and achieve

	animals to draw vectors away from former	in Pakistan and where applicable should form part of education	significant results, people may keep animals in shelters for warmth
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Early Diagnosis and Treatment & Active Early Case Finding

WHO suggests that the most important factors that determine the survival of patients with falciparum malaria are early diagnosis and appropriate treatment. **It is estimated that 52% of deaths occur in the first 48 hours.** Treatment facilities may be few and far between during an emergency or access by the poorest sections of the community may be denied because of the fees levied for consultations or drugs. Essential drugs may not be available and, in the case of chloroquine resistance, may be inappropriate.

An aggressive case finding programme will be justified in high risk situations in order to start treatment in an early stage of the disease. This will help prevent progression to severe or complicated cases and possible death.

Case finding is only practical if there are adequate clinic facilities and supplies of drugs to treat patients. If other international NGO's are supporting clinics they may have initiated a system of outreach workers already and co-ordination with them is essential.

Why do people not seek treatment?

‘The principal problem that arose was with regard to health seeking behaviour due to the poor reputation of curative services in the camps. Specific problems cited were poorly trained staff, excessive waiting times (up to two days) and poor patient flow within the hospitals leading to long waits between initial consultations, diagnostic testing and receipt of treatment. Some groups also expressed concern about open conflict between local and Burundian staff leading to delays in the receipt of treatment. It was recognised that a triage system was in operation but this has led to patients and carers waiting for the development of life threatening illness before attending the hospital. There was a general feeling that hospital staff did not treat patients with respect. All these factors have led to a failure on the part of patients and carers to seek prompt medical treatment at the hospital and to the seeking of alternative treatments such as self treatment with drugs, traditional healers and witchcraft.’ (Vector Control in the Greater Lukhole Refugee Camp – Mark Myatt 1999)

Case finding can be done by health workers, community health workers, community leaders, students, teachers or outreach workers. If the situation is critical and it is necessary for people to work all day, it will be necessary to pay people for this job. Special attention should be given to identifying high risk groups such as children and pregnant women. Often new arrivals to a camp situation are screened and treated if they have symptoms.

Training for the outreach workers will need to be carried out and they will need to be supervised and supported. Provision for follow up training should also be made.

Community mobilisation and education**Global Malaria Control Strategy**

“The Global Malaria Control Strategy places the greatest emphasis on the building of local capabilities to understand and solve problems, more than in the massive use of drugs and insecticides, in the hope of reaching every house and every patient. The strategy promotes the establishment of all possible inter sectoral linkages, as well as community involvement. The main aim of public information and education should be to improve peripheral management of fevers, particularly in young children in highly endemic areas, to improve the utilisation of health care facilities and to obtain the active participation of individuals and communities instead of the passive acceptance of anti malarial drugs or spraying. The school should play a key role as an instrument of education not just for children.” (Najera 1996 **Malaria Control for refugees and displaced populations.**)

WHO emphasises the importance of working in partnership with people to address the problem of malaria and **community mobilisation and education should be the lynchpin of any programme**. Many programmes have failed because the importance of community involvement has not been recognised. Oxfam’s commitment to Public Health Promotion means that it is well placed to become involved in this aspect of malaria control but only where community mobilisation and education form part of a well-defined malaria control programme.

Social Marketing

Social marketing is a communications strategy that draws on the lessons learnt from marketing. The strategy considers the way the product will be priced and how it will be ‘positioned’ on the market. Positioning refers to the way the product is promoted and will be based on substantial formative research. Messages will then be developed in order to make the product as appealing as possible and a promotional strategy will be designed for the target audience.

In the early days of an emergency response there will be little time available for such in depth research and the design of the programme will depend on a more dynamic process of ongoing assessment and redesign. However, the concept of obtaining detailed knowledge about the target audience and why they may or may not value a particular product is very important and in longer term situations a social marketing approach may be feasible.

Indoor spraying of residual insecticide has been the method of control most often used in chronic refugee situations. It is suitable for refugee populations who have built or are occupying mud huts or houses but it is not clear how effective it is on plastic sheeting. To be effective the local mosquito vector must be indoor resting and all houses must be sprayed as residual spraying kills mosquitoes which rest on the walls prior to and following a blood meal. This may have several effects: repelling the mosquito or killing it. The main effect of spraying however, is to reduce the probability of vector mosquitoes living long enough to transmit the parasite.

WHO states that house spraying remains useful in the control and prevention of epidemics, for limited periods provided that it can be applied at the right time and its effectiveness can be maintained. Residual spraying has been shown to be effective in West and South Asia when sprayed at the beginning of the transmission season but is less effective in SE Asia. In areas of high endemicity in Africa the effectiveness of long term residual spraying programmes appears to be limited, partly because of the logistical and financial constraints involved in maintaining spraying programmes. However, in areas where a population of non immunes moves into an area of high transmission, residual spraying is an extremely effective public health measure.

Physiological and behavioural resistance of the vector are also increasing problems. In the former, the mosquito develops the capacity to survive a toxic dose of insecticide. In the latter, the mosquito may start to avoid sprayed surfaces or rooms.

Traditionally, DDT has been the insecticide of choice because of its long residual effect and low toxicity to humans. However, it has been realised that it persists for a long time and can enter the environmental food chain contaminating food supplies. Its use as an indoor spray is still maintained in some areas however, because of the low probability that sprayed surfaces will become part of agricultural land or otherwise enter the food chain. Increasing resistance of the vector to DDT has also undermined its usefulness. Synthetic pyrethroids such as deltamethrin and lambda-cyhalothrin are now considered the most effective insecticides for indoor spraying but their use will depend on licensing arrangement within each particular country.

Spraying has to be repeated annually in Asia and at 3-6 month intervals in stable endemic areas. Repeated application can become expensive in chronic emergencies.

The effectiveness of any spraying programme depends on public acceptance. Usually the longer a spraying programme continues the less the public like it.

However where spraying is still being carried out on a regular basis, it is important to plan a reduction and eventual withdrawal rather than an abrupt finish. An assessment must also be made of people's customs as practices such as replastering of walls, which is often done on a yearly basis and may well undermine the effectiveness of spraying.

House spraying should take place as a pro-active control measure i.e. before the transmission period. It is limited as a reactive control measure because it takes three weeks to begin to affect the overall mosquito numbers but it can still represent a very useful intervention especially in areas where people with low immunity move into an area of high transmission. In some cases it may also be effective to spray houses close to breeding sites rather than all the houses. Effectiveness seems to depend on existing levels of endemicity and levels of immunity in the population. With some short-lived insecticides, spraying may take place too far in advance of the transmission season to be effective. House spraying also requires skilled managers, reliable equipment, well-trained staff and strong financial support.

Oxfam has carried out residual spraying in camps in Tanzania and Burundi and in conjunction with Merlin in a camp and surrounding areas in Newton, Sierra Leone. It has also provided limited amounts of insecticide to government vector control programmes in Burundi and Ethiopia to support epidemic residual spraying and emergency preparedness.

Tent spraying during an acute emergency phase

Treating the inner surface of double-sheeted tents with an insecticide such as permethrin or deltamethrin provides a toxic surface to indoor resting mosquitoes found in south and central Asia and Africa. (Hewitt et al, 1995). It has been suggested that the pre-treatment of tents should be routine practice during new emergencies in malarious epidemic countries.

The jury is out as to whether plastic sheeting can be treated effectively with sprayed insecticide. It appears that a certain amount will remain on the plastic when sprayed but generally it is thought that any leaning against the plastic or brushing past it, will wipe the insecticide off.

It may be possible to treat laminated polyethylene sheeting, which then has a slow release effect. Some manufacturers are currently working to develop such products in collaboration with the RBM programme.

Other types of shelter

Mud, straw, brick wood, wattle, thatch, palm leaf and corrugated iron all have different absorption rates and spraying with insecticide is more or less effective according to the surface treated. Walls made of earth or mud usually absorb a lot of insecticide and some soil walls may contain chemicals that increase the pH, causing rapid breakdown of some insecticides. Walls made of hardwood or walls that are painted will absorb less and are the best surfaces to spray.

Insecticide Treated Materials

Newer methods of prevention using impregnation of mosquito nets, clothing and tents with insecticide have been used in emergencies in Afghanistan and in Africa by various other agencies. Their effectiveness is dependent on the prevailing vectors and characteristics of the target population. Further research is needed to determine whether these methods are effective in other situations and to what extent they alter vector habits and levels of immunity. Whilst the initial results are promising they should not be used as the only method of malaria control.

Insecticide Treated Nets (ITN)

Insecticide treated mosquito nets (ITN) are suitable if vectors have their peak biting time after people go to bed and before they get up and if shelters allow mosquito nets to be supported or hung. They can be used outdoors if suitable means to suspend the nets can be found. They are preferred to untreated nets because they offer more complete personal protection (mosquitoes are prevented from biting through the nets) and they appear to reduce the numbers of vectors by killing mosquitoes that land on the nets although the longevity of this effect seems to be disputed. They also appear to reduce the incidence of headlice, scabies and bedbugs. They are costly but may last longer than other methods.

Concern has been raised about the use of bednets in acute emergencies as cost recovery is often not possible and ensuring adequate retreatment may also be difficult. However, although it is assumed that distributing nets for free may undermine people's desire to purchase replacement nets and pay for retreatment this may not be true. Providing nets in an emergency may allow people to see how useful nets are and provide a stimulus for future net purchase. It would appear that one of the main reasons why people do not purchase nets at present is the high cost of nets, which is often two to three times the wholesale price. In many countries bednets are subject to tax.

Nets may be rectangular or conical and come in different sizes. Family nets are usually the most appropriate but the nets purchased for use in the camps in Tanzania were found to be too large for the shelters so each situation must be assessed accordingly.

Rectangular nets hang from strings or frames and are quite spacious, conical nets are easier to hang and fold up. Sometimes there is an area of sheeting at the top of a conical net, which strengthens the weight-bearing apex.

Polyester is the most common netting fabric as it absorbs very little water. Nylon nets prevent the absorption of the insecticide and cotton nets absorb too much insecticide. A sheeting border protects the bottom edges from being torn when tucked under a mattress or mat (they can also be weighed down

with stones). They vary in durability: 100 denier being the strongest and longer lasting with 40 denier being more easily torn. 100 denier polyester nets can last up to five years but have to be dipped every 6 months. The most commonly used nets are 75 denier and these last approximately 4 years.

Nets come in many colours. Darker greens and blues are preferred as they do not show the dirt so much. This is important because frequent washing of the nets will render the insecticide less effective. Some cultures may not accept a particular colour such as black or white nets because of possible associations with death. If nets are to be sold or there is some concern about the acceptance of a particular colour, it may be worthwhile asking people what colours they prefer.

The specifications for the nets that Oxfam uses are given in the chapter on implementation and these specifications should be adhered to unless justification can be given for changing these.

Newer long lasting nets (Trade name Permanet or Olyset) are now available. These are impregnated with deltamethrin (a type of permethrin) during the manufacturing process. The manufacturers claim they will last up to 21 washes. They have been used with Nomadic populations where access to retreatment of nets may be problematic.

Oxfam in Sudan has also been involved in trials of a new type of net made from the same material as that used for making tsetse fly traps but in addition impregnated with long lasting insecticide. This material is more opaque than normal netting and allows for more privacy for people sleeping outdoors.

The cost of most nets is between US\$5 -\$10 and retreatment costs US\$.50 -\$1.00 per year for the insecticide (this may be done once or twice a year depending on the insecticide used and the pattern of transmission). At present families who are able to afford it, spend money on insecticide sprays, mosquito coils, anti malarial drugs and other traditional control methods. In the long term, treated nets are expected to be more cost effective as nets are durable and can be re-dipped locally or in the home.

The long term consequences of using nets is still not known and it is possible that older groups may become more vulnerable to malaria if they use a net when younger because they have not built up sufficient immunity. It is also possible, however, that older groups will have a better resistance to sickness generally than the under fives. Recent research has indicated that immunity is affected most in areas of intense transmission but further research is needed. Some researchers have pointed out that the risk of rebound malaria is offset by the much larger benefits of malaria control against all cause mortality. Indoor Residual Spraying programmes in Africa have not shown that any rebound

effect after control has stopped although levels will gradually increase to pre control levels.

Even if a person sleeps under a net they will still get bitten at other times by infected mosquitoes. This challenges the body to develop its own protective immunity. Immunity may take longer to build up than in people not using nets. **It is important that people are aware that using nets will not prevent malaria completely.**

A question that is often asked is whether Insecticide Treated Nets are dangerous to children. WHO has approved the use of permethrin for use in bed nets. This insecticide is commonly used as a shampoo or lotion for the treatment of head lice. It is rapidly broken down in soil and sunlight and does not have a tendency to bioaccumulate. The treated nets are deadly to mosquitoes but do not affect people because people are much bigger. Some side effects have been reported such as sneezing and a runny nose with lambda-cyhalothrin but this is not usually serious.

Net treatment process

Ideally recipients should impregnate the materials themselves as this reinforces an awareness of the insecticide, its importance in protection, and encourages proper net care. However, in the acute phase, this might cause additional delay to implementation, so pre-treatment is acceptable in this phase. Following the floods in Mozambique in 2000 pre-treated nets were distributed but this did not affect re-treatment rates. It is widely believed that this was due to the very thorough IEC campaign undertaken by all of the seven implementing agencies.

Safety procedures must be followed when retreating nets and education on safety must form part of the programme. Net re-treatment packs are available and usually provide gloves and insecticide for individual re-treatment. Some packs also provide a plastic bag to prevent the contamination of buckets used for drinking water. Pre packaged kits of insecticide, equipment and instructions are available from Oxfam for treating large quantities of nets. Ensure that the insecticide preparations are licensed for use in country before ordering. A table detailing the amount of insecticide to be used can be found in the section 'Tips for carrying out an ITN project'.

Insecticide treated clothing and tents

Permethrin sprayed blankets and other materials may represent an alternative option where correct use of ITNs is in doubt. Treated bedding has not been tested however, outside Asia or in highly endemic conditions and more research is needed

Permethrin treated outer clothing worn in the evening or in bed has been shown to be effective in Afghanistan but again there is a need for further research in highly endemic conditions.

Tents made of cloth or plastic sheeting may be sprayed to leave a residual but there are varying reports of the effectiveness of this (see above). Treatment of laminated polyethylene sheeting, analogous to the 'olyset' slow release treated nets is a recent development which may prove to be useful (see above).

Relative efficacy and cost effectiveness of ITNs and residual spraying (excerpt taken from RBM in emergencies guidelines)

The alpha-cyano pyrethroids, such as deltamethrin and lambda-cyhalothrin, are the most effective insecticides for indoor spraying or treatment of nets. Permethrin is preferred for topsheets or blankets since it has a very low human toxicity.

Among Afghan refugees in N.E.Pakistan, insecticide treated nets, tents, and housing appear to be equally effective against malaria (giving about 60% protection against *falciparum* malaria). Treated bedding and clothing are 10-20% less effective than treated nets. In endemic Africa, treated bednets are the most effective intervention (reducing malaria death by 42% and morbidity by 45% in the Gambian trials).

Treated bedding and clothing are cheaper than nets in camps since only insecticide has to be provided. House spraying is cheaper than nets if done only once or twice. If people are willing to pay for nets, nets become more cost-effective than house spraying.

Cost analysis is a useful substitute for cost-effectiveness analysis when local effectiveness is not known. When the effects of the interventions being compared are broadly similar such as the use of treated nets or house spraying then cost analysis on its own may be sufficient to make a choice.

In West Asia (Afghanistan/Pakistan), the cost per person protected* per year is:

Treated nets	\$1.5 (in first year, \$0.25 thereafter)
Treated Blankets	\$0.25 (cost of blankets excluded)
House Spraying	\$0.5
Tent Spraying	\$0.25

In Africa residual spraying and bednets appear to be equally effective at reducing malaria but the cost effectiveness and logistical support needed differ.

*Includes cost of insecticide and nets but not of operations. Assumes that house is occupied by 10 people and a net by 3-4 people.

Source Reduction

Source reduction refers to any measure that prevents the breeding of mosquitoes or eliminates their breeding sites. If such measures are long lasting they are often referred to as environmental modification. When they have a short-term impact they are referred to as environmental manipulation.

It may be difficult to achieve source reduction during the acute phase of an emergency except on a local scale, and the impact is often limited especially where vectors, such as *An. Gambiae*, are able to make use of footprints and tyre tracks for breeding.

The following methods of source reduction are often used:

- **drain clean water around tap stands or water points**
- **provide adequate rainwater drainage systems**
- **drain ponds or swamps if this is acceptable to communities**
- **fill in smaller breeding sites with soil, stones or rubble (especially borrow pits – pits made to obtain mud for building)**
- **sluicing of drains or waterways**

Clearing of vegetation from around dwellings is often done to reduce opportunities for mosquitoes to find resting places. However the impact of this type of action is minimal unless combined with other control measures and efforts should not be wasted on mobilising communities to embark on this type of activity. Cutting back grass and vegetation **from the edges of breeding sites** however may help to reduce breeding in some species.

The control of breeding sites needs to be carried out around human settlements in an area with a radius greater than the flight range of the mosquito, which is often about 1.5 to 2km, if it is to be effective. Larval control is thus more costly per person in rural areas than in densely populated areas. In places with intense transmission of malaria, almost all anopheles breeding sites need to be eliminated in order to achieve a reduction in the prevalence of malaria. It may therefore only represent a useful intervention in areas of less intense transmission.

Biological and Chemical Control

Biological control refers to the introduction of natural enemies or predators of mosquitoes such as bacteria, fungi and fish. The two most common methods are the use of larvivorous fish and bacterial larvicides. Chemical larvicides are also available.

Larvivorous fish

Larvivorous fish feed on mosquito larvae. Some of the most successful species have been the 'top minnow' and the guppy. The latter is effective in rice fields in hot areas. However, larval control using fish may take 1-2 months to establish and will only be effective when large numbers of fish are bred. In ponds and marshes where there is dense aquatic vegetation, fish are not very effective. In some areas larger fish for human consumption have been bred alongside smaller larvivorous fish.

Larvicides

Larvicides are used on breeding sites that cannot be drained or filled or where other source reduction methods would be too expensive. However, control using larvicides is expensive and frequent application can become costly. They may be appropriate to use where there are specific breeding sites that are problematic especially near to temporary settlements such as camps or where people's immunity to malaria is low.

Fuel oils are sometimes used to prevent larvae from breeding but this can contaminate the environment and other methods are preferable if available. The most commonly used chemical larvicides are temephos, fenthion and malathion. Only temephos has a low mammalian toxicity and is recommended as being safe to use in drinking water. *Bacillus thuringiensis* H-14 is a bacterial larvicide, available in a slow release briquette that dissolves over about 30 days. They are intended for the treatment of small breeding sites and may not be effective in slightly polluted water. It is safe to use in drinking water.

Temephos, B.t. H-14 and larvivorous fish can all be used in wells to prevent the breeding of anopheline mosquitoes.

Disease Surveillance and Early Warning Systems

Well-managed communicable disease surveillance systems are crucial to effective malaria control allowing local outbreaks and unusual increases in incidence to be identified and the appropriate control measures to be instigated promptly. Meteorological early warning systems can also have a role to play in early identification of weather patterns and climate change that may predispose to epidemics. Unfortunately, in many countries - particularly those where ongoing conflict has led to a disruption in the normal public

health structures, access to reliable data may not be possible. Initiatives that support the collection and analysis of data will help to prioritise areas of greatest risk and will help to clarify intervention strategies.

Inappropriate responses

WHO outlines the following strategies as being inappropriate at any stage of an emergency:

- **Aerial spraying: this is inappropriate for malaria vectors as they are night biters and often rest indoors. It has been used for fly control during emergencies to stop cholera epidemics but is very expensive.**
- **Scrub clearance: there is no evidence that this reduces man-vector contact although clearing vegetation from around unavoidable breeding sites can help to make such sites unsuitable for daytime resting sites.**
- **Outdoor space spraying or fogging: this is not cost effective for malaria vectors and it is environmentally contaminating. It also often fails to reach the targeted vector and therefore has a limited impact.**

However, further research is needed on the usefulness and cost effectiveness of aerosol spraying as a measure used during the acute phase of an emergency. Not only may this help to prevent or limit the extent of a malaria epidemic but it may also reduce the number of flies that may be vectors of diarrhoeal diseases. It is possible that in such circumstances it may represent a more cost effective intervention.

Oxfam's Role

Oxfam's main operational focus will be on addressing the increased mortality in complex emergencies in Sub Saharan Africa but the capacity to respond to potential epidemics in other areas will also be maintained. Response options will include mobilisation and education and the provision of ITN's and residual spraying where necessary. Other vector control measures that may be used are the reduction of breeding sites or the use of biological and chemical larviciding.

All interventions should be accompanied by a clear strategy for Information, Education and Communication (IEC), which will ensure that people have all the necessary information to enable them to take action to prevent or limit the effects of malaria. Whilst it is accepted that the more traditional methods of message dissemination may have a role to play in providing such information, more innovative and participatory methods are also to be encouraged. **Oxfam supports an approach that sees communities as partners in malaria control and which enables communities to better address public health problems such as malaria in the longer term.**

Measures to ensure adequate drainage must also be an important aspect of any water and sanitation programme especially in countries where malaria is endemic. It is recognised that where other control measures are inadequate Oxfam will lobby or provide limited support to other agencies such as the Ministry of Health to provide services for disease management and epidemic surveillance.

Malaria is a complex disease and there is a significant lack of information and research about malaria control methods in emergency situations. The WHO Roll Back Malaria programme is thus concerned that programmes endeavour to monitor the methods they use to inform future interventions. However, the incidence of malaria can be affected by many variables and monitoring the impact of the control method using disease indicators is therefore difficult.

Parasite Prevalence

Slide positivity rate as a measure of parasite prevalence is a very useful malariometric index in unstable malaria areas, since it is independent of population size and may show a sudden increase during an epidemic. Its interpretation depends, however, on the criteria used for taking slides. In such areas *Plasmodium* parasitaemia is equivalent to a malaria episode. In areas with stable malaria, asymptomatic malaria is common, slide positivity may not reflect disease so accurately, and rates must be interpreted cautiously.

Case Control Studies

Case control studies (e.g. comparison of slide positivity rates between personal protection users and non-users) can also be used to help to determine the impact on morbidity rates and these do not rely on obtaining baseline data. Case control studies can also be carried out by sampling families where there has been a death from malaria and comparing them against a control. Such studies require specialised advice on design and sampling. Training for the survey team will be necessary and it is vital that, if families who have been bereaved are to be interviewed, teams are sensitive to this.

Qualitative Data

Large scale questionnaire studies or case control studies take a significant amount of time to carry out but time is often limited in most emergency programmes where funding cycles are usually not longer than six months. **For this reason it is recommended that more participatory forms of data collection are used which can also provide an opportunity for people to learn at the same time.** Whilst such methods do not necessarily produce statistically reliable data they are believed to be more appropriate for the emergency setting and are made more reliable through the use of other methods which allow for data to be cross checked. It should be remembered that many studies carried out without adequate attention to design and sampling methods purport to be reliable but in fact produce data that is invalid. Such methods extract data from people without allowing them to

learn and thus valuable time may be lost in carrying them out without the benefit of producing useful information. Oxfam is currently investigating ways to research this hypothesis and to compare the usefulness of different approaches to data collection.

Part II

Intervention

Oxfam's role and collaboration

It must be recognised from the start that in order to address the problem of malaria, a multi faceted approach must be used. Oxfam is rarely in a position to deliver all the necessary components of an effective malaria control programme and will need to rely heavily on partner organisations such as the Ministry of Health, WHO or other NGOs to ensure that adequate provision is made for diagnosis and treatment especially. In some instances partners may only have a limited capacity to intervene and Oxfam may find that they are the main organisation in a position to respond. In this instance lobbying and advocacy may be needed to encourage others to intervene. In other instances there may be many other partners involved in malaria control and co-ordination with them is essential to make the best use of available resources. A detailed list of potential partner organisations is given in the resources section.

Co ordination during an emergency might be provided under a UN umbrella agency or by a special co ordination body which agencies subscribe to. Within such for it is possible to establish sector committees to address specific health issues.

Malaria control is a specialist activity that should be co ordinated through the general health services. This is as true for a complex emergency as it is for stable conditions. General health agencies (MOH, UN or NGOs) might, for example, co ordinate with an agency specialising in laboratory training services that has taken on the responsibility for ensuring the quality of diagnosis and treatment in NGO clinics. Another agency specialising in disease control might take responsibility for malaria prevention, and provide technical advice, commodities, or training to agencies that want to implement personal protection or vector control in their specific area of operation.

Agencies such as Oxfam must ensure that they collaborate with these health agencies if they intend to become involved in malaria control. It is vital that any programme is planned with the support of these agencies and that continual feedback is provided to them by attending all health co-ordination meetings.

Oxfam's limited experience to date in malaria control has been in residual spraying, environmental control of breeding sites, distribution of insecticide treated bednets (ITN) and community education and mobilisation (Public Health Promotion). Where there are no other agencies providing medical care and where the capacity of the MoH is over stretched some support for essential drugs has also been provided.

It should also be remembered that any water and sanitation work carried out by Oxfam should not encourage mosquito breeding and drainage must be ensured at all water points through appropriate design and community mobilisation.

Examples of Oxfam's involvement in malaria control

- ❑ A joint malaria control projects has been carried out with Merlin in **Sierra Leone**. A joint proposal was funded by ECHO with Merlin providing treatment facilities and technical support whilst Oxfam was responsible for the social mobilisation.
- ❑ In **East Timor** ITNs supplied by IRC were distributed and monitored by the Oxfam community mobilisers. Discussion groups were also held to ensure people knew how to care for the treated nets and the importance of seeking treatment early for children with fever.
- ❑ In refugee and displaced camps in **Burundi** and **Tanzania** residual spraying and bednet distribution was carried out.
- ❑ In **Mozambique** Oxfam collaborated with World Relief, Concern and the MoH to distribute 85,000 ITNs and to provide the necessary community education and support following the floods in February 2000.
- ❑ In **Ethiopia** work was undertaken with the MoH on an epidemic preparedness plan

Oxfam Malaria Control Strategy

The Humanitarian Department has agreed to take a more active role in responding to the risk of malaria. Work will focus on malaria in complex emergencies in Sub Saharan Africa where deaths from malaria are most frequent but Oxfam will maintain the capacity to respond to epidemic risk in all regions. Wherever possible malaria control programmes must fit into the National Strategy for Malaria Control. This may thus entail a longer lead time for the initiation of projects and longer project cycles.

In order to achieve this the department will need to commit itself to improving training and support for Oxford based technical staff as well as staff deployed to the field. The department will also need to draw on the expertise of malaria specialists where there is insufficient data available to inform decisions about intervention. A database of suitably qualified specialists will be compiled but until this is functioning adequately, specialists will be identified through the Malaria Consortium.

The areas of response will be mainly limited to community education combined with indoor residual spraying or the distribution of ITN's. Other areas of intervention will only be undertaken on the advice of a specialist following discussions with the technical (health and engineering) advisors. Where malaria treatment is not available or is severely compromised, Oxfam will lobby other medical agencies to intervene.

The Humanitarian department does not have the capacity to respond to all situations where there is endemic malaria and the initial focus for intervention will be Sub Saharan Africa where *Pl. falciparum* malaria causes the highest mortality rates. However, the Public Health Assessment for all programmes must include an initial appraisal of malaria related morbidity, mortality and epidemic risk. Where these are high a more detailed examination of potential responses should be undertaken.

Therefore:

All assessments will include an initial assessment of malaria risk and the capacity and intention of other agencies (including the government) to intervene. This will be the responsibility of both the Public Health Engineer and the Public Health Promoter

In epidemic prone or high risk areas, where there is an imminent risk of a malaria epidemic, an assessment will be carried out by a suitably qualified specialist who will make recommendations for Oxfam's involvement.

The aims and objectives of the programme must be defined along with indicators and means of verification. All programmes must be evaluated either internally or externally and an evaluation report sent to the Public Health Team co-ordinator in the Humanitarian Department.

In medium risk areas where malaria is usually still a cause of significant mortality, the Public Health Team will assess its capacity to intervene based on public health priorities, project time frame, access to communities and government policy.

(Whilst the decision to intervene or not should not be based on access to funding, this may, in reality, also compromise our ability to intervene.)

The decision on how to intervene must be based on knowledge of the malaria profile for the area. (Accessing all the necessary information is not always possible but some information should be available nationally to identify, at least, the probable vectors. RBM complex emergency country profiles are available on the WHO website.)

Permission from the National Malaria Control Programme or Ministry of Health must be sought before any intervention is initiated.

This document concerns the role that Oxfam has to play in addressing the risk of malaria in Humanitarian situations. This will necessarily entail having an impact in a short time frame. It will often not be possible to employ the methods and procedures used in longer term malaria programmes.

The following principles should always be adhered to:

Bednets:

- The provision of bednets should not be seen as the only possible intervention.
- The contingency supply of insecticide treated nets currently held in stock by Oxfam will be piloted. If, following evaluation, they are found to be unacceptable, modifications will be made.
- Nets may be ordered from a local supplier but will adhere to the specifications (except colour) in the Oxfam Equipment catalogue unless proof of unacceptability can be provided. Long lasting ITN's may also be

purchased if thought to be more suitable for a particular area following discussion with the health advisor.

- Nets should already be impregnated as specified in the equipment catalogue but if sourced locally, impregnation policy should be discussed with one of the technical advisors for the region (either health or engineering). Every effort should be made to include a retreatment phase in the programme cycle but this may not always be possible.
- Baseline data on knowledge of malaria and use of nets must be obtained but it is not recommended that this is gathered through carrying out a questionnaire KAP survey unless the project time frame is a year or more. The Malaria Control Guidelines provide information on gathering Baseline Data and on monitoring and evaluation.
- Reasonable access to the community must be possible to ensure adequate information and education is provided on the use of nets and prevention of malaria if there is little evidence of previous net use.
- Nets must not be distributed in an area where there has previously been little bednet use without providing the necessary education component.

Indoor Residual Spraying

- Indoor residual spraying should usually be confined to camp situations but support may be given to the government to carry out IRS in urban or rural settings if necessary.
- Permission must be sought from the government to carry out IRS and the insecticide used must be licensed in country.
- If IRS is to be carried out it is preferable that existing spray teams are used. Adequate training and careful supervision must be provided. Procedures which ensure the safety of personnel and beneficiaries must be followed.

Other Technologies

- Spraying of textiles (e.g. blankets) and use of larvicides may also be used but must be dependent on specialist recommendation.
- Involvement in disease surveillance, emergency preparedness measures or supporting Early Warning Systems may be potential areas of intervention but specialist support must be sought.

Use of Insecticides

- Safety procedures must be adhered to when using insecticides for spraying or treating of nets.
- DDT should not be purchased using Oxfam funding.

Provision of Drugs

The Humanitarian Department does not normally get involved in clinical care but adequate access to malaria treatment is important for malaria control to be successful. If access to health care or malaria treatment is severely compromised, Oxfam will lobby for the involvement of other agencies. In some instances the provision of essential drugs to the MoH or a partner agency may be made but the rationale for this must be discussed with the health advisors in Oxfam House.

Specialist Support

Do I need an expert?

Designing an appropriate malaria control programme which is cost effective and which is likely to deliver rapid results within the limited time frame of most emergency interventions is not without pitfalls.

Expertise in designing such programmes is undoubtedly valuable but the right kind of expertise is crucial. If communications allow, discussion with the technical and health advisors in Oxfam House should be sought to identify if outside specialists are required and the profile of such specialists.

For example in the assessment phase someone with both vector control knowledge and experience of designing appropriate interventions would be important. In the implementation phase the team may need help with carrying out a residual spraying campaign or organising the targeting and distribution of bednets. Support may also be needed to conduct case control studies if these are to be used for assessing impact.

One of the key aspects of a malaria control programme is the community mobilisation and education (often known as IEC – Information, Education and Communication) and adequate human resources must be ensured to maintain this aspect of the programme.

If Oxfam is to learn from its programmes and develop its capacity to carry out malaria control effectively, it is vital that monitoring and evaluation of programmes is carried out. Specialist support may be needed to carry out a comprehensive evaluation.

Local expertise may also be available. Health ministries usually have epidemiologists and entomologists who may be able to provide information on patterns of disease, malaria vectors and current government strategy. Some countries have a National Malaria Control programme and their advice and support should always be sought. Expertise may also be found within other organisations such as WHO or other International NGOs.

Initial data will be required in order to make decisions on whether to intervene or not and what is the most appropriate response. This should be gathered in a variety of ways. Discussions must be held with the MoH and especially with representatives from the National Malaria Control Project. The opinions and views of epidemiologists and entomologists from both the MoH and WHO, if available, should also be sought.

If possible written research on vectors should be accessed using both internal and external mechanisms. RBM country profiles should be available on the internet as well as malaria maps detailing rainfall and other data to assist in predicting epidemics (addresses are available in the resources section). Discussions with both female and male community members will help to give a more detailed picture of the situation and will also provide important information for decision making. A more thorough analysis of the malaria profile for the region will also provide some insight into the extent of the problem and will provide information necessary for designing a response.

What do I need to know?

The following key factors have been known to make the risk of an epidemic more acute and are thus considered as **RISK A** situations. An assessment of these factors should be undertaken as soon as possible:

- **migration of non-immune groups into areas with current malaria transmission**
- **migration of infected groups into malaria-free areas which are capable of supporting renewed transmission**
- **any areas where there is a significant risk of epidemic for reasons not specified in the above**

In addition Oxfam will consider as a priority area of intervention:

- **areas of high endemicity in Sub Saharan Africa where a breakdown in normal Public Health Structures undermines usual malaria control efforts. (In such situations certain groups such as pregnant women and young children may be more at risk of malaria).**

These may be exacerbated by environmental and structural changes that favour vector breeding, increased man-vector contact or increased

transmission such as an increase in breeding sites or the lack of health services.

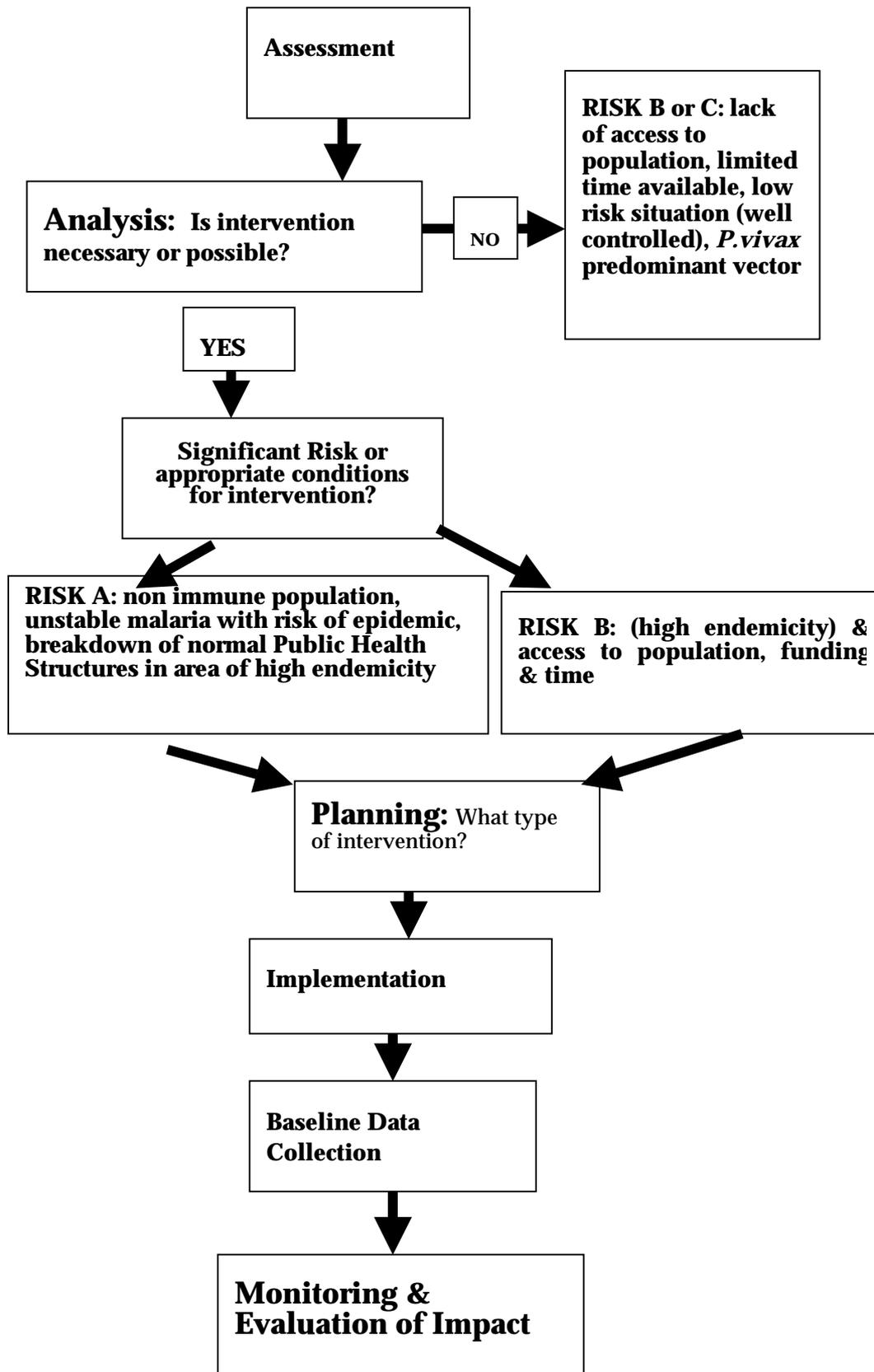
RISK B situations are areas where malaria is highly endemic and where there is often a high mortality amongst pregnant women and children but where it may not always be possible to intervene in the short term because of e.g. lack of adequate access to populations, lack of government support or lack of funding.

RISK C situations are those where malaria is endemic but is well controlled by existing structures or where the prevailing vector is *P. vivax* (South and East Asia and Central and South America – excepting epidemic situations)

The categorisation of malaria into RISK A, B and C situations over simplifies a very complex subject. It is done for the purpose of guiding decision making in emergencies where intervention is often constrained by a shortage of time and resources. Such a simplification does not apply to situations outside of the emergency context where a more detailed analysis and response is both possible and preferred.

Planning Model for Emergencies

The following planning model is suggested. Details of how to assess and when to intervene are given in the following chapters.



Initial Assessment

The following list of questions provides a guide to determining initially whether or not intervention is necessary:

- Is there an outbreak of malaria or potential risk of epidemic*?
- Have non-immune people moved into an area where malaria is highly endemic?
- Have conditions altered to favour vector breeding or parasite development in areas where people have low immunity?

High Risk Situations

In Tanzania in 1998 large numbers of Rwandan and Burundian refugees suffered an epidemic of malaria with a high death toll especially amongst the under fives following movement from an area of low endemicity to high endemicity. In areas of low endemicity, immunity to malaria often does not develop adequately and people are then more at risk of epidemics.

- Have existing malaria control services been undermined?

*An epidemic is usually defined as an unusual increase in the number of cases of a disease compared to the usual pattern for the particular time of year.

- Is the clinical diagnosis confirmed by laboratory tests? Could the rise in 'unconfirmed' malaria be due to other causes of fever and if so what? Which plasmodium species causes the majority of malaria cases (if *Pl.falciparum* is the main cause higher mortality rates would be expected).

Diagnosing Malaria

The symptoms of malaria, especially in children, are very similar to those for several diseases such as meningitis, typhoid, dengue fever or pneumonia. In many countries diagnostic facilities are not available and therefore cases are diagnosed on clinical symptoms and fever is treated as if it might be malaria in order to achieve greater coverage for what can often be a fatal disease if left untreated.

- What is the 'normal' mortality rate for malaria? In areas of stable transmission such as Sub Saharan Africa this will often be high and intervention may therefore be appropriate. Data can be obtained by asking the population what people die from and who dies (age and sex) as well as asking Ministry of Health officials.
- What is the size of the population at risk?
- Is the outbreak spreading? Where?
- How many cases and deaths have there been so far – does this represent a significant increase taking into account seasonal variations?

- What are the possible sources, modes of transmission? (areas of swamp or flood waters that haven't receded)

Site Planning

In many emergency situations the displaced are often accommodated on land that nobody else will live on. One of the reasons for people's avoidance of this land may be because it is close to mosquito breeding sites. It is vital that this is taken into consideration when camp sites are planned and that every effort is made to house IDPs or refugees on land which does not undermine their health.

- What is the capacity and intention of other agencies (including the Government) to intervene?

Further Assessment

In order to determine what intervention is appropriate the following information is also important:

Vector and Parasite Characteristics

- Anopheles species and habits – resting location, feeding time and location, host preferences, breeding sites, insecticide susceptibility
- Epidemiological characteristics: is this an area of stable or unstable transmission and what is the endemicity (low, medium, high or intense)?
- Environmental risk factors: climate (areas of high temperature and humidity allow more rapid development of the parasite), timing of rainy season (usually peak incidence of malaria follows end of rainy season when breeding sites are undisturbed by frequent, heavy downpours but for residual spraying to have any effect this must be conducted at least three weeks prior to the end of the rains), breeding sites (may have increased because of unusually heavy rains and/or flooding or drought which may dry normally running water to areas of still water)
- Plasmodium species and resistance to treatment

Population characteristics

- Number of people at risk and groups at risk (new arrivals, pregnant women and children)
- Immune status of the population
- Have semi or non-immune people passed through an area of high endemicity?
- Capacity of clinics and health centres to provide first and second line treatment
- Treatment seeking behaviour for malaria (do people delay in seeking treatment?)

Cultural Beliefs and Practices

In some areas women have to obtain permission from their husband or mother in law before taking their child to the health post/ traditional healer. In other areas mild malaria and cerebral malaria are seen as two separate diseases. Fitting children are often taken to a traditional healer first. Health centres and hospitals are often seen as places where people die. Different treatments may be tried before people seek conventional medicine and serious complications may have arisen by the time the child is taken to a hospital. Focus group discussions with separate groups of men and women are a good way to find out about such beliefs and practices and to identify strategies to overcome specific problems.

- Shelter type – permanent mud/brick walls, plastic sheeting, matting etc – is residual spraying appropriate for this type of shelter?
- Sleeping habits – how do families sleep – do several family members share a bed – what time do people of different ages go to sleep and get up?

Sleeping preferences

People may choose to sleep outdoors and therefore hanging bednets may be problematic or they may feel that it is too hot to sleep under a net. In one programme in Ethiopia bednets were thought to be inappropriate because people lit fires inside their shelters at night and nets are highly flammable. All of these issues must be understood before an appropriate response can be designed.

- Cultural beliefs and knowledge about malaria cause and prevention
- Other cultural practices which may affect the type of intervention e.g. replastering walls may be a problem if this is usually done following the rains (and residual spraying if carried out)

It may be useful to fill in a malaria profile for the area as detailed on page 56

Communicable Disease Surveillance

In order to determine whether there is the risk of a malaria epidemic, timely and comprehensive data collection systems, especially epidemic surveillance systems, need to be in place. These should work by collating all the attendance data from clinics in a particular region in order to obtain forewarning of increasing incidence rates. In addition most clinics should be reporting unusual disease cases and patterns of disease and cases that are resistant to treatment as rapidly as possible so that the necessary investigations can be carried out.

Unfortunately in many countries disease surveillance systems do not function adequately and there is no central body available for giving timely information on potential outbreaks.

The Public Health Promoter should be liaising with clinics and health facilities to try to obtain this information. Trends in disease incidence and seasonal variations are also important so data needs to be obtained over a period of several years if possible. Epidemics in some areas seem to follow a cyclical pattern over 5- 10 years.

If no data is available, clinic staff may be facilitated to do this by asking them what help they need to carry out this aspect of their work and assessing to what extent Oxfam resources can support this. Limited help in the form of stationary etc. may be provided on a short-term basis. However, such support will have a limited impact on the capacity to predict epidemics.

Discussions must also be held with the MoH and especially the National Malaria Control Programme representatives (NMCP) if one exists as well as representatives from WHO and other medical organisations who will all have an interest in epidemic preparedness. This should provide an overview of the vectors involved, transmission and likelihood of epidemics.

Community Data Collection

It is also important for the PHP to ensure that communities are also consulted on the incidence of diseases in their area. Participatory tools such as seasonal calendars can be constructed, if there is time, with community groups or key informants to obtain an overview of the seasonal pattern of disease and to discuss current trends. This can also act as a springboard for suggesting that

community groups or leaders maintain their own records of sickness and death although it is difficult to ensure the smooth functioning of such a system within the short time frame afforded by most emergency programmes.

Focus group discussions

A framework of questions is provided in the resources section at the end of this manual. This can be used for the initial assessment stage and subsequently when obtaining baseline data for future monitoring and evaluation. It is a very useful way to rapidly understand people's understanding of malaria, the effect malaria has on them and who is affected and even to obtain an idea of the biting and resting habits of the common mosquito species.

Seasonal Calendar

Seasonal calendars can also be constructed on the ground or on paper. They can detail the months or seasons of the year, rainfall patterns, food availability and incidence of malaria and diarrhoeal disease allowing people to see the connections between such factors and triggering further discussion and understanding between participants and facilitators. They are useful in the assessment phase especially when there is very little statistical health data available.

Co-ordination meetings

Regular co-ordination meetings with the health agencies working in the region are also an important means of collating information in most emergency situations and both the local and headquarters meetings should be attended if possible.

Mosquito surveys

There are various types of vector studies that might be used if data is not already available. It may be necessary to deploy an international consultant to carry out the survey if there are no national specialists available in country.

Surveys are carried out in order to determine the vector involved in transmission if this is not already known. Not all biting mosquitoes will be transmitting malaria and examining mosquitoes for the presence of malaria parasites may need to be carried out. This is a specialist task involving examination of the salivary glands of the mosquito.

In addition it may also be useful to clarify the spatial distribution of the vector (where biting or breeding take place) so that control interventions can be better targeted e.g. if all biting occurs on the edge of a camp or settlement then control measures can be targeted to these areas. More precise knowledge of biting times may also be useful as this should clarify if people are indoors, asleep, or asleep under a net during peak biting times.

If surveys are carried out it will be necessary to explain to communities how the studies are conducted and why and the role they have to play in carrying them out.

In longer term malaria control programmes the above information is important for monitoring the situation but insecurity or the urgency the situation may preclude carrying out such surveys in an emergency. If specialist help is available, however valuable information can be obtained fairly rapidly and this will help to improve the targeting of the programme.

Example Malaria Profile

Anopheles Species	Resting Location	Feeding Time/location	Host preferences	Breeding Sites	Plasmodium species/resistance	Epidemiological data and transmission	Epidemic Risk
<i>An. Gambiae</i> s.s	Predominantly endophilic but exhibits partial exophily	Preference for nocturnal feeding, peak biting time 21.00-04:00 bites indoors and out	Anthropophilic	Temporary habitats – puddles, hoof print, tyre tracks and borrow pits. Will breed in stagnant water	<i>Falci-parum</i> 80% <i>Ovale</i> 10%	Meso endemic to hyperendemic, areas of unstable transmission. Last epidemic in 1990, usual seasonal increase but numbers higher than usual this year. Cyclical pattern of epidemics every 10 years	Current malaria epidemic in South Nyapondo region

At risk groups	Predominantly pregnant women and children but people living in lowlands may also have increased risk
Shelter/ housing type	Semi nomadic people living in shelters made from grass matting
Treatment seeking behaviour and appropriateness of treatment	Very few clinics – people may walk up to two hours to nearest clinic, limited drug supply - cost recovery – poorest cannot afford to pay. Women expected to seek permission of husbands
Will people use/retain bednets? (if vector characteristics indicate this as a possible option)	Very little experience of bednets – some people do own them – thought to be useful to allow a good night's sleep, general ration adequate and people have some resources camels, sheep and goats
Rainfall and weather patterns	2 rainy seasons from March to June and October to January – heavier rainfall than usual this year
Sleeping habits (time and place for different age groups)	Children under five sleep early – usually by 7pm Pregnant women often sleep early as it is believed to be beneficial but depends on workload and husbands
Existing vector control strategies	Ad hoc residual spraying in towns – said to be a response to epidemics but not conducted this year because no insecticide available No NMCP
Knowledge about prevention and treatment of malaria	People unaware that malaria transmitted by mosquitoes, do not usually take their children to clinic for fever but treat this with herbal medicines – if deteriorates then will seek help but do not like going to health centres or clinics Smoke leaves to deter mosquitoes

Analysis of the above information should give some indication of the most appropriate response but the initial decision to intervene or not can be controversial. The decision to intervene should be based on the degree of epidemic risk and/or high mortality rates. The situations outlined previously as 'Priority A' give the greatest cause for concern. However, in some countries where there is 'stable' malaria transmission, mortality rates may be high amongst certain groups such as young children and pregnant women. The breakdown in health facilities caused by conflict or natural disaster may make such groups even more vulnerable. Intervention may be justified in such situations, but a longer term perspective is critical, as interventions may do more harm than good if not planned and carried out in a sustainable fashion.

In times of acute crisis there may also be other public health problems such as diarrhoea or malnutrition which are responsible for increased mortality. Resources may be better employed in addressing these more significant health risks than in trying to tackle malaria in a population where there is a degree of immunity already in the adult population and where the time available for intervention is limited.

Interventions such as the provision of bednets stand a better chance of success where there is the opportunity for ongoing follow up such as in the case of long term government supported programmes. The National Malaria Control Programme of a country may have such a strategy in mind and they may feel that the free distribution of nets will undermine their attempts to ensure that there is some degree of cost recovery for the nets to enable re dipping to take place. In such a case it may be preferable not to provide bednets as part of a short-term response unless there is a high risk of an epidemic or unless the government structures can be incorporated into the response. Adequate access to the population and a long funding cycle also make the provision of bednets in such situations more viable.

In some countries long term complex emergencies may have caused a significant breakdown in health services. In a population where immunity is low this may leave people very vulnerable to disease. Where there is little hope of the situation ameliorating in the near future and no significant capacity within the existing government Ministry of Health, it could be argued that in such extreme conditions even short term interventions are acceptable to alleviate suffering and death. In such a case the distribution of bednets – so long as it is accompanied by information and education may be justifiable even though there may not be adequate provision for retreatment of nets. Nets are easy to transport and in situations where people are continually vulnerable to upheaval, nets (if retained) may be one of the few interventions available to reduce the toll of mortality and morbidity due to malaria. If

funding is available, the provision of bednets may be justified if there is adequate scope for community education. Documentation and further appraisal of the effectiveness of such interventions under such conditions is necessary in order to determine their usefulness.

A logical framework should be used to plan the intervention to ensure that objectives and indicators are defined as clearly as possible (*see page 65 for example logical framework*). A list of possible indicators is given on page 90. These are not all included in the logical framework in order to make it as simple as possible. However, process indicators involving gender issues or community problem solving should be included in the monitoring framework.

Decision making

The decision-making matrix on the next page is meant as a guide only for possible interventions in areas where malaria is endemic. The choice of intervention for disease prevention in the acute phase cannot be prescriptive and will vary according to funding available, feasibility of the response and the cost and speed of supply.

The human resources available for such a response and the logistics required will also need to be taken into account to determine whether an intervention is likely to be effective. All interventions to date have been undertaken in addition to water and sanitation interventions and it is important that work on malaria control does not compromise efforts to mobilise communities to prevent high mortality and morbidity due to other water and sanitation related disease.

The decision about the kind of intervention should also be taken in the light of existing country programmes and their strategic change objectives. If the right to health and education is seen as a strategic change objective, it may be possible to initiate emergency programmes which can be subsequently supported by the country programme. The provision of ITNs or longer-term drainage works might be appropriate and the country programme staff should be involved as much as possible in the design and execution of such projects.

If possible any intervention should be defined in consultation with the Ministry of Health or the equivalent. A Memorandum of Understanding should be drawn up with the authorities detailing the responsibilities of both (an example MOU is given in the resources section).

The information from the initial assessment should help to determine if epidemics are likely and what the possible responses might be. For example bednets will be inappropriate in a population where the anopheles mosquito bites outside and predominantly before people go to bed. Residual spraying will not be of use where the anopheles rests outdoors (exophilic) or at the

height of an epidemic unless it is believed that the epidemic will last for some time.

If clinics are unable to provide adequate treatment the best response might be to provide the MoH with essential drugs for a limited period or to lobby other organisations to provide this support. Access to clinics may also be limited for many people either because they are not willing or able to travel long distances or because they cannot afford the drugs. In some cases village level Community Health Workers have been trained to dispense first line malaria treatment such as chloroquine but any such initiative must be undertaken with the approval and support of the MoH.

Deciding How to Intervene

In Burundi – a country where people have been forced to flee their homes on numerous occasions- residual spraying was carried out in the camps around Bujumbura. As security improved and plans were made for people to return to their homes it was decided that ITNs would be distributed to each family ensuring that intensive education on bed net care and maintenance was provided prior to their departure. As people came from long distances, it would have been difficult to continue working with all the affected population and it was known that on their return home they would have only minimal access to health care. It was believed that this population already weakened by malnutrition would thus be even more vulnerable to malaria.

Decision making matrix

Priority Status	Indoor/ outdoor resting mosquito	Peak Biting time	Other influencing factors (examples only)	Potential Oxfam Response
Priority A – unstable transmission or non immune population	Indoor	Before people go to bed	a) Walls suitable for spraying, people sleep indoors, government approval obtained, spray teams available	Education, active case finding if epidemic, source reduction a) Residual spraying only (prophylaxis for pregnant mothers and children if practicable)
Priority A – unstable transmission or non immune population	Indoor	After people go to bed and before they get up	a) Walls suitable for spraying, people sleep indoors, government approval obtained, spray teams available b) see below	Education, active case finding during epidemic, source reduction a) Residual spraying & b) ITN provision (prophylaxis for pregnant mothers if practicable & acceptable)
Priority A – unstable transmission or non immune population	Indoor	After people go to bed and before they get up	b) Access to population, population used to using nets, suitable shelters for hanging nets	Education, active case finding if epidemic, source reduction b) ITN provision
Priority A – unstable transmission or non	Outdoor	After people go to bed	b) Access to population or population used to using	Education, active case finding, source reduction,

immune population			nets suitable shelters for hanging nets	b)ITN provision only, ((possible prophylaxis)
Priority B –: Expected seasonal peaks in transmission causing significant mortality exacerbated by social or environmental factors. Other risk factors for disease transmission not significant	Indoor	After people go to bed	c) Adequate access to population, long term support from government or other agency, adequate funding cycle	Education, source reduction, c) selective provision of ITNs to pregnant women and children under five

Malaria Control Example Logical Framework			
NARRATIVE SUMMARY	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>AIM</p> <p>To contribute to improving the health of the at risk population</p>	mortality and morbidity rates from all causes	health centre records, mortality records from	assumes that stability is maintained and that further migration or flooding does not take place, assumes easy access to population
<p>PURPOSE 1</p> <p>Ensure that community capacity to respond to malaria risk is enhanced</p>	Appropriate use of ITNs organisation of health committees and action taken by them	Project records, community discussions Mini surveys	Assumes target group will learn to value ITNs and that other needs are being met
<p>OUTPUT 1</p> <p>People have the means to protect themselves from malaria and dengue vectors and the number of vectors is kept to an acceptable level (Sphere Vector Control Standards 1 and 2)</p>	Provision of 10,000 insecticide treated bednets to families with pregnant women and children under five, Malaria and Dengue awareness campaign targeting whole population and schools, reduction in breeding sites	Household assessment forms, group discussions, mapping of breeding sites and leaking pipes	Assumes government support for project continues, flood waters subside and there is no new flooding
<p>OUTPUT 2</p> <p>All sections of the community are aware of what they can do to prevent malaria and dengue fever and are mobilised to take action to control these diseases. (Sphere Hygiene Promotion Standard 1)</p>	Increase in timely under five consultations for malaria, reduction in breeding sites around dwellings, use of bednets by pregnant women and children under five	Health centre records, focus group discussions, pocket charts, observation	Assumes accessibility of health facilities,
<p>OUTPUT 3</p> <p>The disaster affected population has the opportunity to participate in the design and implementation of the assistance programme (Sphere Analysis Standard 3)</p>	Representation from all sections of community in detailed assessment and community defined objectives for action	project records, focus group discussions and interviews with key informants	Assumes that defined priorities of the various groups are considered important by the team and facilitated by the management structures
<p>ACTIVITY 1</p> <p>Identify Public Health counterparts and provide three day orientation</p>	Numbers of staff identified and training completed	Project records, training evaluation	Assumes willingness of Ministry of Health to second counterparts

NARRATIVE SUMMARY	MEASURABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
ACTIVITY 2 Conduct baseline survey to ascertain knowledge of malaria and dengue, bednet use and treatment seeking behaviour	number of focus groups and research sessions held with different groups, quality and quantity of data gathered	Project records and reports	Assumes ability to communicate with target population
ACTIVITY 3 Carry out mapping exercise within all of the target communities to identify leaks in water supply network	Identification of major leaks	Project maps	Assumes community knowledge of location of major problem areas and willingness to divulge this information
ACTIVITY 4 Repair leaks in the water supply systems which enhance vector breeding	Number of leaks repaired	project records, maps and observation	Assumes community willingness to have leaks repaired
ACTIVITY 5 Identify and train community volunteers to promote use of nets and other vector control measures	Number of volunteers identified and trained	project records, training evaluations, community action plans	Assumes willingness of community to volunteer for these activities
ACTIVITY 6 Distribute insecticide nets to pregnant women and families with children five years old	Number of nets distributed	Project records, household assessment forms	Assumes prompt purchase and delivery of nets
ACTIVITY 7 Design malaria and dengue leaflets to provide key information	Number and quality of leaflets designed	project records	Assumes availability of printing facilities
ACTIVITY 8 Organise 10 teacher's workshops to promote control of mosquito vectors	Number of workshops held	project records, training evaluation	Assumes willingness of Ministry of Education and teachers to take part in activities
ACTIVITY 9 Ensure close liaison with government and other agencies	Number of meetings attended	project records	Assumes adequate co-ordination maintained
ACTIVITY 10 Ensure ongoing assessment, planning and monitoring of the project (update log frame as necessary)	quality and quantity of data obtained,	project records	Assumes situation remains stable and access remains possible

Priority A Interventions

Intervention should focus on areas of unstable malaria transmission and low to medium endemicity or where non-immune or semi immune populations have moved into an area of medium to high endemicity. In acute periods of crisis where there are large population movements, it is probably not useful to try to undertake work on malaria control where other diseases are a more significant risk and where the population already has a high degree of immunity. In this acute period there is the danger that the provision of bednets especially, may not be well planned and such an intervention may stand a better chance of success if undertaken when risks have been reduced.

At the height of a crisis when there may be widespread need, there may not be time to find out all the information necessary and assumptions may have to be made. Such assumptions should be based on as much locally gathered information as possible. Assess the potential for all public health epidemics and define which poses the most immediate risk.

Information may be available in the form of country profiles or research, which can be sourced from outside the country at the same time as the initial assessment is taking place. Co-ordination with Oxfam house and with other agencies is vital at this stage to ensure that any initial response is as well planned as possible.

If diarrhoeal disease and malaria carry an equal risk, ensure that resources are available to address both in co-ordination with other agencies.

Community members should also be given as much information as possible about the risks they face and what can be done about them.

Priority B Interventions

Agencies do not always begin working in critical emergencies and each situation must be assessed accordingly. In such a situation there may still be the risk of future epidemics and an assessment of the risk of future epidemics and epidemic preparedness plans should be made by all agencies concerned.

Agencies need to review the control measures that have been identified as emergency needs change and mortality is brought under control. As malaria

is a focal and controllable disease it may be necessary to re deploy resources to where they are most needed if the situation warrants it.

In areas of stable malaria transmission, where epidemics are not predicted, there may be opportunities to become involved in malaria control but such interventions should be part of a longer term strategy supported by government structures.

In some situations it may be possible to instigate cost recovery for ITNs or at least for the retreatment process. Free or reduced cost distribution may be necessary for the most vulnerable (widows with young children, orphans etc.). Repayment schemes may also be introduced as a means of helping people to spread the cost over several months. Where funding is only available for three to six months such an intervention may not be appropriate unless this can be handed over to the government and/or another NGO.

In the IDP camps in Kenema in Sierra Leone, Merlin provided bednets for pregnant women and children at a cost of the equivalent of \$2.50. The money that was raised was used to pay for community projects which were chosen by the camp members. Treatment of nets was carried out when several people had made requests for the nets and a record taken of when retreatment was required.

Source reduction may become more possible as the situation stabilises. Rehabilitation of irrigation and water supply sources should always ensure that breeding sites are minimised. House spraying should become increasingly focal as the situation stabilises and the prioritization of camps for spraying should be based on sound indicators such as malaria incidence rates to ensure cost-effectiveness.

Staffing (see resource section for job descriptions)

The staff required will depend on the type of intervention chosen but it is critical that at least one staff member is skilled in IEC (information, education and communication) methodologies and particularly in participatory learning methods. If a residual spraying campaign is to be carried out there may be skilled spray teams available locally but it is important that this work is supervised adequately. If large-scale source reduction such as drainage works is to be carried out then an engineer with experience of work in similar conditions will be required.

Public Health promoters might come from a health education or environmental health background. They could also be social workers or teachers involved in adult education. Environmental health supervisors may also have experience of carrying out residual spraying. All of these people

will both have skills to contribute but also will learn from their involvement in a malaria control project. Ideally the relevant ministries should be approached in order to identify appropriate staff.

Integration of work is an important element of any Oxfam programme as beneficiaries will not perceive different sectors of a programme and will simply refer to what 'Oxfam' is doing. A programme should aim to provide a co-ordinated approach which maximises the synergy or 'value added' impact possible from integration. At the community level therefore, it makes sense to have only one system of outreach workers or public health promoters. At the management level it may also be preferable to have one person who ensures integration. However, in a high-risk situation it may also be necessary to have additional people whose sole responsibility is the malaria control project. These people would be responsible for managing the data collection, negotiation with government officials, designing promotional aspects and supervising community level activities.

Other Resources

Adequate logistical support including transport will be necessary and must be budgeted for. If ITNs are to be distributed extra transport and logistic support may also be necessary. If residual spraying is to be carried out, equipment and protective clothing will be necessary as well as transport for spray teams and supervisors. Maintenance of equipment must also be considered. Lead times for ordering materials such as ITNs or insecticides should also be ascertained as early as possible.

Tips for carrying out residual spraying (see WEDC manual on Emergency Vector Control)

- Residual spraying is usually carried out using a hand compression sprayer and equipment that meets WHO standards must be purchased along with protective clothing for all those handling insecticide. Spare masks and gloves should also be purchased.
- Plan the residual spraying in conjunction with those normally responsible for such activities if possible and ensure that adequate numbers of spray personnel and supervisors are identified.
- Ensure that the insecticide that is ordered is licensed for use in country. Be aware that delivery often has a long lead-time. (see page 72 for more details on purchasing insecticides)
- Adequate and secure warehousing facilities must be identified.
- The teams of spray people must be adequately trained and it is preferable if they have had some experience of residual spraying prior to implementation. Even if they have had prior experience, their technique should be verified and a refresher training undertaken.
- If there are no teams with prior experience of spraying, training must be instigated ensuring that each person meets the practical standard required. A wall is usually used for training purposes and spray equipment filled with water. Health and safety measures must form part of this training and it is vital that everyone involved knows what to do if there is an accident. They must also know the signs of insecticide poisoning to look out for (pyrethroids can cause paralysis of the face and hand, irritation of the upper respiratory tract and excessive salivation). **Communication skills should also be a part of this training ensuring that those involved are able to provide appropriate information, answer people's questions and are respectful of people's homes.**
- If inexperienced teams have to be recruited, it is recommended that they have basic education and are at least literate.
- The number of spray people required will depend on how critical the emergency is, the number of homes to be treated and access. Teams usually comprise one spray man and one assistant. Five to seven teams can be managed by one supervisor and if there are more than seven teams an overall co-ordinator will be required.
- Ensure that the community is well informed of the planned spraying and that they have a chance to raise any objections or issues that have been problematic in the past.
- Define a plan detailing which spray teams will cover which areas.
- Identify an area where insecticide and equipment can be stored and cleaned. Ensure there is access to water to prepare the solutions and soak-away pits for the disposal of polluted water. This area should be located at least 1km from any settlement.
- Ensure that the local health facility has necessary facilities to deal with insecticide poisoning.

- Spray men should work a maximum of four hours per day only and five days per week, to avoid contamination and poisoning.
- Ensure that the community is reminded about the spraying programme on the evening before it starts and that people are required to leave their shelters during spraying and remain outside until the insecticide has dried. Food and drink must be taken out of the shelter and any animals should be tethered (see page 88)
- Supervisors should monitor the work of the spray teams and address any complaints from community members.
- Care must be taken in disposing of all excess insecticide and empty containers which should be cleaned and buried.

Supply of chemicals/insecticides

Chemicals may be provided in different formulations and the exact formulation required should be specified. For indoor spraying purposes, the water dispersible powder is the most effective formulation in most countries because it is most suited for porous surfaces such as mud or brick. The following tips may be helpful:

- All chemicals imported/bought for spraying need a licence for retail in country and this must be checked with the government authorities
- Vector susceptibility should be checked prior to purchase
- All containers must have a batch number, a manufacture date and an expiry date –
- A sample from each batch should be checked to ensure that these criteria are fulfilled. The name of the insecticide should be associated with an ISO number (International Standardisation Organisation).
- A sample of each batch should be checked to ensure that it is insecticide as it has been known for harmless powder to be sold as insecticide. The insecticide should have a WHOPES number which means that it has been tested to ensure that it meets WHO specifications
- Always buy from a reputable supplier which should provide a ‘service-level’ contract
- Maintain an audit of supplies, delivery and where used

A list of suppliers for each country is given in the RBM country profiles. The logistics department maintains a list of UK suppliers of insecticide and which have branches or contacts overseas. The Oxfam equipment catalogue details insecticide for the treatment of bednets.

Important Lessons from Tanzania

An order for ICON 10-WP was placed with Twiga chemicals. They delivered two types of ICON 10-WP. One type had neither batch number, neither manufacture date nor expiry date. A second type had a batch number and a manufacture date but no expiry date. The spraying programme started in the first week of August but the programme co-ordinator at Oxfam's Ngara office was suspicious of the chemicals delivered and dispatched four samples to the Tanzania Tropical Pesticide Research Institute (TPRI) for analysis on 8/8/98. The TPRI replied on 14/9/98 requesting payment of \$1000 before releasing the resulting analysis. This request was refused and the TPRI have subsequently revealed that the chemical delivered was 'expired' ICON 10-WP and they hinted that spraying with the sampled chemical would not have been effective. They remained reluctant to disclose the full results prior to receipt of payment. (from **Vector Control in the Greater Lukole refugee camp – Mark Myatt**)

Health and Safety

If spraying is to be implemented the health and safety of those involved must be ensured. All spray workers should be provided with protective clothing (broad rim hat, goggles or face shield, face mask, long sleeved overalls, rubber gloves, boots) and soap and given training on safe handling of insecticides.

Curative medical services should hold sufficient stocks of drugs required to treat acute or chronic insecticide poisoning. If these are not available then Oxfam should supply them with instructions for use. Extra insecticide should be disposed of in the latrine and not in open water courses as it is hazardous to fish and other wildlife. Adequate information must be provided to people having their homes sprayed. Details of what community members need to know is given on page 50. Sprayers must adhere to the following safety regulations:

- Do not eat, drink or smoke whilst working
- Wash your hands and face with soap and water after spraying and before eating, smoking or drinking
- Shower or bathe at the end of every day's work and change into clean clothes
- Wash your overalls and other protective clothing at the end of each working day in soap and water and keep them separate from the rest of the family's clothes
- If the insecticide gets onto your skin, wash off immediately with soap and water

- Change your clothes immediately if they become contaminated with insecticides
- Inform your supervisor immediately if you do not feel well

Instruction and safety booklets are available from WHO.

Tips for the provision of ITNs (see 'Insecticide Treated Net Projects, A handbook for Managers')

- Ensure that discussion has been held with the Ministry of Health and especially with the National Malaria Control Project if one exists. A memorandum of understanding will need to be drawn up so that all parties involved are clear about what is expected of them in terms of initial management and longer-term support.
- Plan and budget for at least one retreatment cycle at the start of the project. Leaflets providing information about retreatment should also be budgeted for.
- Use the specifications detailed in the Equipment catalogue for ordering nets. These specifications have been researched by the Humanitarian Department and should not be changed unless there is significant justification:

Bednet Material	knitted polyester
Denier	75
Mesh	156
Size	130x180x150cms
Impregnation	Permethrin Public Health Grade

- Distribution lists will need to be drawn up and verified. Such lists may already be available in a camp situation. It is helpful to have lists of potential beneficiaries even if nets are to be 'sold' as this will help to identify if there are any abuses of the system.
- Ensure that adequate records are maintained of where nets go to and when retreatment is required. If possible these records should be maintained by a community based structure.
- Nets are usually provided at a subsidised price but some vulnerable groups may need an additional subsidy. Payment methods should also be explored if people have trouble in purchasing the nets.
- Ensure that community based education and information is provided prior to the distribution of nets and that net use is monitored following the distribution. The actual distribution can be used as an opportunity to reinforce some of the information provided but should not be used as the only education provision.

- Ensure that people know that the nets have been treated and need to be retreated in six months, that the nets should not be washed and if they are they will need to be retreated, who should have priority in their use, care should be taken in hanging them and preventing or mending holes.
- People also need to be aware that bednets alone will not completely prevent malaria and emphasis should be made on seeking early treatment and reducing avoidable breeding sites.
- If time allows purchase untreated nets and treat as the nets are given out. In more critical emergency situations treated nets will have to be purchased.
- It is important that a central outlet is available for the supply of nets but community health workers or other outreach workers could be charged with actually handing them over to community members. They can then show people how to dip and hang the nets appropriately and provide other information on correct care of the nets. In some programmes community committees have managed the funds made from the sale of the nets. This is subsequently available for purchasing more nets or retreating nets.
- Ensure that people are aware of the safety precautions they need to follow when retreating nets. Gloves should be worn and excess insecticide must be disposed off safely in the latrine. Containers used for dipping nets should not be used subsequently for food or drinking water.
- Centres can be identified where nets are dipped en masse or individual treatment sachets and instructions can be distributed for people to dip the nets at home.

The table on the following page gives estimated amounts of insecticides that are required to treat nets en masse:

Amount of water and insecticides required to impregnate bednets

Area of netting	Amount of water needed in ml			Amount of insecticide required in ml		
	Polyethylene	Nylon / polyester	Cotton	Permethrin 25%	Deltamethrin 1%	Icon 2.5%
1 m ²	14	30	130	1.2	2.0	0.4
11.6m ²	163	348 <i>Oxfam net</i>	1508	13.9	23.2	4.6
10 bednets	1630	3480	15.08 l	139.2	232	46.4
20 bednets	3260	6960	150.8	278.4	464	92.8
50 bednets	8.2 l	17.4 l	75.4 l	696	1160	232

Recommended doses/m² for selected insecticides used in bednet impregnation

Insecticides	Recommended doses in g/m ²	Range of acceptable doses
permethrin	0.3	0.2 - 0.5
deltamethrin	0.2	0.01 - 0.025
Lambda-cyhalothrin (Icon)	0.01	0.01 - 0.015

- In order to distribute nets effectively, a list of beneficiaries will need to be drawn up. In some situations such as in camps or where other relief distributions are being made, lists will already be available. In other situations it may be necessary to verify community produced lists or to carry out a registration of beneficiaries. Details of how to do this can be found in the Oxfam series: Working in Emergencies, Practical Guidance from the field: 'Registration and Distribution'.
- Following the distribution it is important to carry out a household assessment to verify if the target group is actually using the nets and if people are satisfied that the distribution was fair and people have received their entitlement. The checklist used should be as simple as possible. Only 8 to 10 households should be chosen for each area up to a maximum of 100 households to provide some feedback on the outcome of the distribution rather than to provide data that is wholly representative. This tool is adequate to identify problems quickly and should be cross-checked at subsequent focus group discussions or community training groups. An example household assessment form is given in the resources section.

Baseline Data

This should be gathered within the first month of the project but in an emergency situation it may be necessary to commence implementation at the same time as gathering baseline data. Many participatory assessment methods allow for such an approach as open discussions are held and people asked to define solutions to the problems identified. For example if a map is drawn of breeding sites this provides baseline data. Subsequent discussion on what can be done about those breeding sites can then generate action to address the problem. Similarly focus groups can concentrate on understanding what people know already but then use the opportunity to discuss what can be done to prevent malaria or serious complications of malaria.

Baseline data will need to focus on the educational intervention and on what people know, do and think at the beginning of the project. Evaluation of impact will subsequently attempt to determine what people have learnt and what they have done in response to the mobilisation and education sessions and to what extent this has made a difference to their lives.

The conventional form of data collection for malaria control projects is known as the KAP study which is often reduced to a questionnaire survey on what people know, do and think. This may yield some interesting data but usually such information is limited and such a technique does not provide enough depth to allow a real understanding of the issues. It must also be realised that the analysis of such data will be very time consuming and resources may need to be made available for this if the actual implementation of the work is not to be interrupted.

In some countries you may find that the MoH insists on the use of KAP surveys. If used they should be designed and supplemented by information from other more participatory and in-depth methods. Any information gained should be discussed with people in the community at a general meeting.

Participatory Data Collection

This approach to data collection is perhaps the most useful for the emergency context as it allows for an understanding of the situation to be gained at the same time as mobilisation of communities and groups. In order to make the data as reliable as possible it needs to be collected in a systematic way and cross checked by using a variety of methods.

Try to find out as much about the geographical area you intend to work in – looking at differences in population characteristics e.g. urban/rural, ethnic group, main occupation or predominantly male or female and divide these areas into clusters which have similar characteristics. Conduct at least four focus group discussions – two with men and two with women with similar backgrounds – in each cluster. Ensure that these discussions are either recorded or that notes are taken. In addition carry out two mapping exercises and two seasonal calendars in each cluster (again one male and one female if possible). It should also be possible to carry out such an exercise with a group of TBA's, teachers or leaders as part of the training process.

Focus group discussions

Use a question framework as provided in the resource section but adapt this to suit the situation as you come to understand the situation better. The focus groups need to be carried out in a systematic way and separate, homogenous groups of men and women should be identified. Even if public health promoters think that they understand the problem and people's views on malaria this information cannot be assumed to apply to the present community. Try to ensure that a quiet place is found to conduct the discussion and make it as interesting as possible by using e.g. pictures or samples of larvae.

Mapping

Maps can be constructed on the ground or on paper depending on what the group prefers. Such maps can detail both water and sanitation facilities as well as vector breeding sites, homes of pregnant women and under fives and general information about the community or settlement. The process of drawing such maps can also stimulate discussion about malaria and its control and motivate people to take action to address some of the problems.

Seasonal Calendar

Seasonal calendars can also be constructed on the ground or on paper. They can detail the months or seasons of the year, rainfall patterns, food availability and incidence of malaria and diarrhoeal disease allowing people to see the connections between such factors and triggering further discussion and understanding between participants and facilitators.

Health data

Whilst the main focus of the baseline data collection will be on people's knowledge and practices, it is also important to examine whether the intervention has an effect on mortality and morbidity rates. Such indicators cannot be used on their own as these rates even for malaria alone will be affected by many factors outside of the project control such as temperature,

rainfall, health status, malnutrition etc. and within a short time frame will not provide a reliable indication of the effect of the intervention.

Attendance data from clinics should be monitored. If possible try to ensure that this data is disaggregated by sex (especially if there is some suspicion that female children are not treated the same as male children) and gives data for adults and under fives. If such data is not collected, negotiations could be held with the MoH to identify possible short term support or to offer training to motivate staff.

Prevalence studies may be helpful in determining whether the intervention has had an effect on morbidity and mortality rates. Such studies must be repeated at the same time of year in order to reveal any reliable results. Oxfam does not at present have the capacity to carry out such studies but other organisations involved in malaria control may be in a position to do so.

Often a Prevalence Survey & KAP study are carried out at the same time. Three teams of four to six people are involved and each made responsible for one aspect of the survey. Blood samples are taken by one team, the KAP survey is administered by another team and the third team provides treatment for those with positive blood tests or those with clinical symptoms. Two people are charged with identifying the sample through a random selection working from a central point in the camp or settlement if no census or registration lists are available. All members of the household have blood samples taken and all are asked the questions on the KAP survey with parents answering on behalf of younger members. Rapid diagnostic tests allow for an immediate recording of results and are to be preferred to taking slides for subsequent examination.

Oxfam staff will probably not be involved in carrying out blood tests but may need to explain how this process will work to community members. It will be important to find out such details from the other agencies involved and to ensure that community members are given accurate information.

Once enough information has been gathered from whatever means it is vital to compile a **BASELINE DATA REPORT** as much information is often lost because it is not recorded. It may be useful to hold a meeting with the team to try to define the information more clearly and to ensure that all available information is collated. Meetings to discuss this data with community groups should also be held.

Information, Education & Communication:

Raising awareness in the community

In order to raise awareness in the community, a variety of approaches such as community mobilisation or social marketing may be used. These approaches are not necessarily mutually exclusive although they may be based on different philosophies.

Social marketing is a means of reaching a large target group through the use of marketing strategies such as advertising. The promotion of a particular product such as ITNs or condoms is based on significant formative research to determine the nature of the target group and the best way to persuade them to accept the product. This will also involve research into appropriate pricing and outlets for the product.

Community mobilisation works on a more local level and stresses the need for participation in decision making, mobilising communities to take collective responsibility for protecting their health. It requires more intensive human resources to work closely with groups and communities but does not need to rely on gathering all the information before designing a response as continual interaction and feedback allow for immediate intervention. Similar education techniques may be used by both approaches such as the use of songs, drama or slogans to raise awareness but Oxfam's approach to community mobilisation also stresses the use of more participatory techniques such as interactive games, mapping and seasonal calendars to stimulate action.

Use aspects of social marketing when you have adequately understood the situation but as far as possible try to encourage people themselves to think through the problems and identify some of the possible solutions. Do not just rely on message based information and never assume that you have all the information necessary to make decisions for people. Always be ready to listen to what different groups of people have to say.

Who to work with

Even if a malaria control project is targeting women and under fives with a distribution of bednets it is vital that the accompanying public health promotion targets all sections of a community. Malaria affects everybody so everyone needs to know what will help to prevent malaria or prevent unnecessary death from malaria. The distribution of bednets may be targeted at pregnant women and children under five but if husbands and fathers are

not aware of the reasons for this the nets may not be used appropriately. Many women may also depend on permission from their husbands before seeking treatment for their children and therefore it is vital that such issues are discussed with both men and women.

Key Informants, community leaders and committees

It is unwise to just rely on outreach workers to carry out the promotional work. Public health promotion must be dynamic if it is to achieve results and it must try to explore every possible means of motivating community involvement.

It may be useful however to work specifically with certain groups who may be influential. Community leaders are an important group to work with, as are teachers who may be very influential in the community and with their pupils.

Traditional birth attendants may be able to encourage mothers to use bednets or to seek antenatal care. Street vendors who sell medicines for malaria need to know the importance of taking the full treatment and can advise their customers accordingly. In some countries they are provided with certificates which allows them to sell malarial drugs but any such initiative should be undertaken with the support of the Ministry of Health.

In some countries there may be health or development committees or councils already in operation and it is useful to identify these and to initiate some work with them. The extent of involvement with such committees will depend on how representative they are of the population.

The following is a list of potential community partners:

Camp or village leaders

Women's leaders and groups

Traditional Birth Attendants

Community Health Workers

Pregnant women & Mothers

Teachers and children

Clinic Staff

Street vendors (selling malaria treatments)

Youth groups

Religious Leaders

Trade Unions

Training sessions or regular meetings may be held for these groups. Each group should also be asked how useful information may be spread to the rest of the community and they should be encouraged to be a part of this process feeding back issues and problems to Oxfam staff.

Community mobilisation and education

Addressing the problem of malaria is not easy and it has been recognised that in order for programmes to be successful it is important for all those concerned to work in partnership. This includes working in an open and transparent way with community members and providing them with all the available information in a way that allows them to also make choices and decisions.

Community meetings should be held in order to explain to people the nature of the problem and to enable them to define what the possible solutions are. It is inevitable that the presence of outsiders in a community will give rise to raised expectations of what they are able to provide. It is important that openness and honesty is used to counter this rather than attempting to carry out investigations such as vector studies without adequate explanation. Every community can do something to try to limit the spread of malaria and even if it is decided that a bednet distribution or residual spraying will not be carried out people will need to know the reasons why and what else they can do.

Community meetings, training sessions with community groups and house to house visits can all serve as means to both provide information and to allow people to learn more about the problem of malaria. If such meetings are held in a participatory way they can also stimulate people to take responsibility and action to tackle the problems. Training and mobilisation will involve a combination of providing information and giving people the chance to share the information and understanding they already have and how they interpret the new information that has been provided. It should also lead to people defining actions they will take to try to address the problem of malaria.

Working with Children

It is important to ensure that some aspect of the programme focuses efforts on raising awareness of the prevention of malaria with children. Child-to-Child produce an activity sheet on malaria (provided in the resources section) which could be adapted to the local situation. More information is specifically required on the use and maintenance of ITNs. Workshops can be held with teachers but should be planned with the Ministry of Education or the equivalent to ensure that this supports existing health education work. In a camp situation teachers may have been recruited by other agencies and temporary schools set up. In this instance negotiation about the content of the syllabus will have to be held with the agency and teachers themselves.

Integration with other Public Health Promotion Activities

Having separate teams of public health promotion staff to address malaria and other water and sanitation related disease will not allow adequate integration of the response and it is probably preferable to work using a phased approach – addressing the most important issues first and consequently bringing in other issues. If community mobilisation and participation are seen as key elements of the Oxfam response, the use of separate systems of outreach workers or community mobilisers may work counter to achieving community defined action with each system competing for the community's time and commitment. However, as discussed earlier, it may be useful to have some Oxfam staff who are devoted to addressing the issue of malaria but who are part of the public health team. In this way initial community meetings should be attended by representatives from both sectors but the collection of baseline data and other specific activities can be managed by different people. It may also be possible to hold joint training programmes.

Learning and Training

It should be recognised that learning does not just take place in formal workshops and every contact with community members is an opportunity to enhance your understanding of the problem and people's knowledge about what can be done to tackle the problem. Even during the initial investigations into the types of vectors and breeding sites community members should be involved. A ladle and pipette can be used to collect specimens as part of a training exercise especially if people are unaware of the fact that larvae develop into mosquitoes.

The content of the training must of course be based on the information gathered from the initial studies and the detail of the proposed intervention.

Raising Awareness

In East Timor community mobilisers were provided with ladles and pipettes and conducted surveys to identify the proportion of potential breeding sites where mosquito larvae were identified. By carrying out the survey with householders they were able to show people exactly where the breeding sites for dengue mosquitoes were and they then asked them to think of how to stop further breeding. Most people were horrified to find that mosquitoes were breeding in their water containers – they simply hadn't noticed this. Although this method is particularly useful to use in Dengue control programmes as *aedes* mosquitoes breed in water containers found in compounds, it is also possible to take people to *anopheles* breeding sites so they can see for themselves the 'at risk areas'.

The importance of using participatory methods for

training cannot be over stressed. The simple didactic dissemination of messages is not enough to stimulate action and what is needed is discussion to

motivate people to become involved and to work both individually and collectively to prevent malaria.

The following timetable for a two day training for public health promoters could be conducted over the course of several days or weeks depending on the situation and the urgency of intervention. All theoretical training should be supplemented by fieldwork and on the job training.

Two Day Training Timetable For Field Officers

Time	Day 1	Day 2
9.00-10.00	Malaria Quiz (see appendix)	Mapping & Seasonal Calendar
10.00-10.30	Break	Break
10.30-11.30	Malaria Overview	Mapping & Seasonal Calendars Continued
11.30-12.30	Country Specific Information	Objectives and Indicators Activity
12.30-1.30	Lunch	Lunch
1.30-2.30	Response Options Activity	Who to work with & How
2.30-3.30	Focus Group Discussion & Feedback	What people need to know activity: using training modules
3.30-4.00	Break	Break
4.00-5.00	Review & Evaluation	Review and Evaluation

A community training timetable for village elders might look something like this:

Training Timetable for Village Elders or TBAs

Time	Activity
1 st Session	What do we know about malaria?: Focus Group Discussion using pictures
2 nd Session	Malaria Overview (use pre prepared visual aids)
3 rd Session	Mapping of breeding sites and problem solving
4 th Session	Seasonal Calendar
5 th Session	Review of local malaria problems and prioritisation (ranking exercise) (Include information on importance of early diagnosis and treatment and bednets or residual spraying if applicable)
6 th Session	Plan of Action – who will do what

Social Marketing

Message based promotional work may help to raise awareness over a large target area but messages must be based on a sound understanding of the situation and how people will perceive the message. Promotional campaigns can be designed using any available media.

Radio

Radio is often useful but it is important to determine whether people own radios, when they listen to them and which programmes they listen to. Children's radio programmes may be particularly popular and children can be involved in designing the content of the radio programme themselves.

Posters & leaflets

The value of posters on their own appears to be limited but they may reinforce information gained from elsewhere. In areas where literacy is minimal it is important to pretest posters and to ensure that the information is interpreted correctly. Where literacy is high, leaflets may be of more use than posters as they can provide more detailed information. During times of crisis people may be eager to obtain any reading material and a series of newsletters or a one of newsletter could be produced to provide information about vector control and other emergency services available. If money is not available for mass production of newsletters, they could be posted in areas where people congregate such as markets or religious institutions. Leaflets are often designed and distributed to inform people about retreatment of nets. Even where literacy is not high, someone in the family such as a schoolchild may be able to read out the instructions.

Community Gatherings

If religious leaders are in agreement, talks could be held after services to provide information about planned interventions or particular details about the use of ITN's. It may also be possible to have a soapbox in the local market or to hold impromptu or organised shows within the camp. Locally based artists (acrobats, musicians or actors) may be happy to work with the programme and to promote both themselves and the programme. If funding is available it may be possible to construct a meeting room of some sort and organise different events for different groups in a camp situation. A safe space might also be provided for women and discussions and facilities might be arranged to meet their particular needs.

What do people need to know?

In the initial stages of an emergency you may have to rely on a more didactic provision of information but wherever possible the responsibility for problem

solving should be handed over to the people you are working with. For example in a community meeting you can present people with information and then ask them what they think can be done about the situation - try to list four or five actions which will then be carried out before the next meeting. In a training seminar do not tell people what they should be doing but ask them to suggest what should be done and how they will do it.

Malaria is a very difficult problem to tackle but if people work collectively on the problem progress can be made.

Some or all of the following responses might be useful in trying to tackle malaria:

- Ensure that people (especially those most at risk – usually young children and pregnant mothers) receive treatment **EARLY** and take the **FULL** treatment.
- Reduce the number of breeding sites by ensuring no standing water or pools etc. and by keeping vegetation around pools and rivers to a minimum. It is difficult to clear all the breeding sites such as rice paddies and large areas of swamp but it may be possible to introduce larvae eating fish into these areas. There are also some types of insecticides and bacteria which get rid of larvae but these need to be applied regularly and may be harmful to birds and fish.
- Use treated bednets – **BUT** mosquitoes that cause malaria bite at different times and if they bite in the early evening before people go to bed then bednets won't work.
- Residual Spraying of walls – **BUT** the mosquitoes that cause malaria can rest indoors and outdoors. Residual spraying won't work if they rest outdoors so this needs to be determined as soon as possible.

Treatment

Sometimes people don't take the full course of treatment because it is expensive – they take some and then stop and save the remaining tablets for the next time. This means that the parasite is not killed completely and becomes resistant to the drug and the drug can stop working. In areas of stable transmission most adults have developed some degree of resistance to malaria – they may still get sick but don't usually die just from malaria. However young children and pregnant women have a lowered immunity and are more at risk. Often children are not taken early enough for treatment. Cerebral malaria can develop very quickly (within 48 hours) so all children with fever need to be seen in the clinic promptly. Families need to know how to care for children with uncomplicated malaria and when it is important to take the child to the clinic.

Try to identify the reasons why people may not go to the clinic and if possible try to address this. If clinic staff are involved in some of the problem solving groups they may be helpful in suggesting ways of dealing with long waiting times or staff who do not show patients enough respect. It is vital that men

are involved in discussions about seeking early treatment as women may have to seek their permission before being able to take their children or may need to be accompanied by a man.

In some remote areas it may be possible for Community Health Workers to distribute simple medication for malaria either as treatment or prophylaxis to at risk groups but if this is to happen it will need the help and support of the MoH. It may be possible for Oxfam to support such an initiative in the short term if there is an epidemic of malaria.

Pregnant women

Pregnant women are usually more at risk of developing malaria especially during their first and second pregnancies as their immunity is reduced during pregnancy (this is believed to occur in order to prevent early rejection of the foetus). Regular attendance at antenatal clinic is important. Pregnant women are usually given treatment on their first visit as parasitaemia (malaria parasites in the blood) may be present without any clinical signs. They will then be given prophylaxis (preventative treatment) each time they visit. They may need to be reminded of the importance of taking this weekly or encouraged to go to the clinic for antenatal care. It is important to find out what advice is recommended by the Ministry of Health in the area you are working in.

In Mozambique it was thought to be unhelpful to target a bednet distribution at women who were pregnant at the time of distribution and therefore all fertile women were targeted. In some programmes nets are distributed at the clinic when mothers attend for antenatal care and this may be a useful incentive to encourage attendance.

It is important to work with women who are either pregnant or likely to become pregnant to explain to them the specific risks that they face and what they can do to protect themselves.

Source reduction

Mosquitoes can breed in many different environments even hoof prints and tyre tracks. Reducing the number of breeding sites will thus reduce the number of vectors (although this has to be significant to reduce the transmission of disease). It is difficult to manage the problem just by getting rid of breeding sites because mosquitoes can fly quite a long way so breeding sites might be up to 2km away and some species such as *An. gambiae* can breed in even the small amounts of water found in a footprint. It is probably not helpful for communities to put all their efforts into source reduction only to find that the incidence of malaria stays the same so if source reduction is advocated, this should be backed up by more effective methods.

However, it could be argued that the long term sustainability of any malaria control efforts will eventually depend on limiting the number of breeding sites.

Treated bed nets (ITNs)

If it is decided that bednets are an appropriate response the following information will be useful:

In many projects bednets are targeted at the most vulnerable groups. This will often be pregnant women and children under five especially those from the poorest families who may not be able to afford prompt treatment and cannot afford to buy a bednet. In certain circumstances other groups may also be more vulnerable than the rest of the population such as people exposed to mosquitoes in the course of their work. Vulnerable groups are most likely to become seriously sick or to die from malaria whereas less vulnerable groups may become ill with malaria but will have built up a certain degree of immunity to the disease.

If bednets are given free of charge, people may not value them enough so many projects insist that a fee is paid for the nets which should be based on how much people can afford and how much they are willing to spend. In humanitarian situations however, people may not have the resources to even pay a token fee and it may be decided that the nets should be distributed free of charge. Whilst the common belief is that this undermines the sustainability of the project, more research is needed to verify this belief. It may also be true that in emergency situations people are more willing to take on new ideas and that this may then subsequently create a demand for a product where previously there was none.

When discussing the cost of nets with people, it is useful to discuss what they currently spend on treating and preventing malaria. People may spend money on coils and medicine, which may amount to as much as a net over the course of six months or a year.

Nets work best if they are treated with insecticide. This needs to be done every six months and the nets should not be washed during this time. Coloured nets are usually preferred so they do not show the dirt so easily. In some projects untreated nets are distributed and then treated with community members. Education must focus strongly on the need for regular reimpregnation, maintenance and eventual replacement of the net. The project will need to consider options for this even if Oxfam cannot carry out this phase of the project themselves.

In some programmes mending kits are also provided with the nets and people will need to know the importance of checking the nets for holes and mending them as soon as possible.

It is vital to keep accurate community based records (if possible) of who has received a net and when the net will need re dipping. Ledgers and pens should be provided to committee members or outreach workers who are responsible for this and support may need to be given to help them maintain them accurately.

Residual spraying

If residual spraying is considered necessary it is important to discuss this with people to ensure they accept this is necessary and will allow spray teams into their shelters or homes. People will need to know when the spraying will be carried out and how in addition to the following safety information:

- Insecticides can be dangerous and must be treated with caution. Residual spraying can last between six to eight months.
- Safety precautions must be adhered to when the house/shelter is being sprayed:
- Remove all cooking utensils, drinking water and food from houses.
- Ensure food and water is covered.
- Keep animals in cages or secure away from spraying.
- Remain out of house for one hour until the spray is dry
- Sweep all insects and dispose of in the latrine (do not give to chickens!)
- Do not stand downwind of spraying
- Wash all utensils on return to house
- Ensure children do not scrape walls on return to house

It is important to consider the issue of monitoring and evaluation as soon as possible at the inception of the project. One of Oxfam's most significant failings is the lack of systematic evaluation of its humanitarian programmes.

If a programme is planned using a logical framework, it should be possible for monitoring and evaluation to be carried out in a way that will allow future learning and accountability. An example Logical Framework for a malaria control programme is provided in the section on planning. This details the indicators and methods for measuring those indicators that might be required.

It is important to rationalise the number of indicators that are used as attempting to gather too much information may well undermine the success of the evaluation process and it is important to differentiate between monitoring and evaluation. Monitoring attempts to look more broadly at what is being done and the processes that are used. Regular monitoring reports should be provided which can provide a basis for future evaluations or impact assessments. A monitoring system should have the capacity to identify newer, more appropriate indicators that should be used to update the logical framework as necessary. Regular team meetings should provide a venue for attempting to assess what has been achieved and how.

What to monitor and how

The most important indicators that the programme should be monitoring are proxy indicators of impact such as the appropriate use of nets or action taken by beneficiary groups. This is explained in more detail on the following page.

Health Indicators

Disease indicators should be set from the outset and monitored regularly to ensure progress, coverage, and to guide strategic direction. The disease indicators selected will depend on the state of the surveillance system. The following list provides a choice of potential disease indicators but only one or two indicators should be selected: As Oxfam does not normally provide clinical care it may not always be easy to access clinical data. It may however be possible to encourage the community to record deaths or severe sickness.

- Number of patients with acute febrile illness seen in health facility in given period (week/month)
- Number of laboratory confirmed cases of malaria in a given period
- Number of laboratory confirmed deaths due to malaria in a given period

- Number of deaths following a febrile illness as recorded by community leaders or from recording burials or cremations

Such indicators are insensitive however and should be used with caution. Crude mortality rates should also be monitored as it is difficult to assess deaths from malaria where acute respiratory infections and diarrhoeal diseases are common.

Proxy Indicators

The incidence of disease is affected by many variables and it is therefore difficult to draw any direct conclusions about the impact that your project will have had on malaria from health data alone. It is therefore suggested that **PROXY INDICATORS** are used which serve as a viable substitute for health data. In the case of an ITN project, this would be the **appropriate use of and retreatment of nets**. In a residual spraying programme it would be a combination of **adequate coverage** of households and **appropriate spraying technique** used by spray teams. These indicators allow us to draw inferences about the impact of our programme because they have been shown to have an impact on health in previous research. Other indicators of the success of a malaria control programme might be:

- Increase in **timely consultations** for fever in under five population (or decrease in late referrals to clinic)
- Increase in regular antenatal consultations

In addition there should be some attempt to measure participation, gender equity and sustainability. The following indicators might be used:

- The design of the programme operates a mechanism for representative input from all users and when questioned women and men state that they have been involved in the process and provided with information to allow them to make informed decisions
- Community groups have set their own objectives for action to control malaria
- The viewpoints of men and women are provided in the baseline and monitoring data
- All sections of the community have been provided with information and learning opportunities
- Women particularly have been facilitated to make decisions concerning the project
- Gender training has been provided to all new Oxfam staff

Sphere Standards

The Sphere minimum standards provides the following indicators with regards to malaria control and it may be useful to add these to the monitoring

framework or to fill in the form given below. Depending on each particular situation some or all of these indicators may be applicable:

SPHERE MINIMUM INDICATORS FOR VECTOR CONTROL & DRAINAGE		
	Key Indicator	Comments
1.	Vulnerable populations are settled outside the malarial zone	
2.	The population of malaria bearing mosquitoes is kept low enough to avoid the risk of excessive malaria infection	
3.	Mosquito breeding or resting sites are modified where necessary and practicable.	
4.	There is no standing waste water around water points or elsewhere in the settlement	
5.	Storm water flows away	
6.	Water point drainage is well planned, built and maintained. This includes drainage from washing and bathing areas as well as water points.	
7.	Sufficient numbers of appropriately designed tools are provided to people for small drainage works and maintenance where necessary.	
8.	People with treated mosquito nets keep, use and retreat them correctly	
9.	People avoid exposure to mosquitoes during biting times using the means available to them	
10.	Breeding sites are removed, emptied of water regularly or covered.	
11.	The purchase, transport, storage and disposal of pesticides and application equipment follows international norms and can be accounted for at all times	
12.	Personnel are protected by the provision of training, protective clothing & a restriction on the number of hours handling pesticides	
13.	People are protected during and after the application of pesticides according to internationally agreed procedures	

14.	The quality of pesticides conforms to international norms	
15.	The quality of treated bednets conforms to international norms	
16.	The design of the programme operates a mechanism for representative input from all users	

Whilst these indicators are not complete, they provide a basic outline of what a malaria control project might be aiming to achieve.

Methods for Monitoring

The methods used for monitoring can be similar to those used for gathering baseline data. Household assessments can be used to ascertain if people are using ITNs and who is using them. Spot check assessments might endeavour to gather a large number of observations of bednet use or domestic breeding sites in order to provide more quantitative and representative data. Household assessments however are used to provide rapid information on the success of a distribution and must state clearly that this is not necessarily representative. The number of households 'sampled' must be given if numbers are converted to percentages.

Key informant interviews and focus group discussions can also be used to monitor what is happening in the community and whether there has been a change in people's perception and knowledge of malaria. Repeating the mapping exercise in different communities can allow people to see if there has been a change in the number of breeding sites.

Details on methods for monitoring and evaluation are to be found in the Oxfam Guidelines on Public Health Promotion.

Evaluation

In evaluating a project, an attempt is made to gain an overview of how the project was carried out. The following areas are often examined: impact, effectiveness, appropriateness, connectedness, cost effectiveness and efficiency. Impact is a key area that is often not evaluated sufficiently. Recently Oxfam has provided a framework for impact assessment that looks at five different areas of impact:

- ❑ **changes in people's lives,**
- ❑ **sustainability,**
- ❑ **participation,**

- **impact on gender equity**
- **changes in policy and practice**

This framework can also be used in the emergency context depending on the acuteness of the situation. Initially it may not be possible to achieve change in all these areas in the short time frame afforded by emergency situations but all aspects should be considered and the opportunity should be taken where possible to ensure that objectives encompass these goals.

It is important that any impact assessment undertaken seeks the opinions and participation of the community and uses the exercise as an opportunity for learning not only for project staff but also for community members.

Part III

Resources

Several agencies can provide specialist assistance on malaria:

Malaria Consortium

Dr. Sylvia Meek or Dr. Jayne Webster
Malaria Consortium UK
London School of Hygiene & Tropical Medicine,
Keppel Street,
WC1E 7HT
Tel: 00 44 171 927 2439
Fax: 00 44 171 580 9075
E-mail: sylvia.meek@lshtm.ac.uk
jayne.webster@lshtm.ac.uk

CDC (focal point for US NGOs – may have more detailed information on countries where US involvement)

Dr. Holly Williams
Malaria Epidemiology Section
National Centre for Disease Control and Prevention
Mailstop F22
4770 Buford HWY
N.E. Atlanta, GA 30341
USA
Tel: 00 1 770 488 7764
Fax: 00 1 770 488 7761
E-mail: hbw2@cdc.gov

RBM network for Complex Emergencies

Dr. Richard Allan
World Health Organisation
20 Avenue Appia
1211 Geneva 27
Switzerland

Tel: 00 41 22 791 4316

Fax: 00 41 22 791 4824

E-mail: allanr@who.int

Malaria Network established by WHO in 1998 aimed at malaria control managers and ministry of health staff

<http://www.malariainetwork.org>

Asian Collaborative Training Network for Malaria (ACTMalaria)

<http://actmalaria.org>

Multilateral Initiative on Malaria (MIM) Newsletter, published by the Wellcome trust since mid 1998 to provide information on current activities

<http://www.wellcome.ac.uk>

Mapping Malaria in Africa (MARA) which produces theoretical maps of malaria risk

<http://www.mara.za.org>

MALSAT research Group: the role of Environmental Information /systems is an operational research group working towards the establishment of improved methods of malaria stratification, monitoring and surveillance and epidemic preparedness.

www.liv.ac.uk/lstm/malsat.html

A volunteer web site providing country profiles and other references

<http://www.anopheles.com>

Levels of Malaria endemicity:

Hypoendemic: Little transmission, malaria does not affect the general population importantly (spleen rate in children aged 2-9 years is less than 10%)

Mesoendemic: Typically found in rural communities with varying intensity of transmission (spleen rate in children 11-50%)

Hyperendemic: Areas with intense but seasonal transmission where immunity is insufficient to prevent effects of malaria in all age groups (spleen rate in children constantly more than 50% and in adults more than 25%)

Holoendemic: Areas with perennial high-degree transmission producing considerable immunity in all age groups, particularly adults (spleen rate in children constantly more than 75%, but low spleen rate in adults)

Aerial Spraying

A type of space spraying of insecticide from low flying aircraft over large areas of land. This is usually done with the ULV method using the same insecticides as for ground fogging programmes but using different preparations.

Aerosol Spraying

Use of aerosols producing very tiny liquid or solid particles suspended in the air.

Anaemia - decrease in number of red blood cells and/or quantity of hemoglobin. Malaria causes anemia through rupture of red blood cells during merozoite release. The anaemia caused may be extreme. Pallor may be visible in the patient..

API - Annual Parasite Incidence. $API = (\text{confirmed cases during 1 year} / \text{population under surveillance}) \times 1000$.

Autochthonous - locally transmitted by mosquitoes. Differentiated from imported, congenital, or blood-borne malaria.

Case Fatality Rate (CFR):

The number of case deaths during a certain period (usually one week) divided by the total number of cases in the same period x 100 = CFR as %

Cerebral malaria - this grave complication of malaria happens at times with *P. falciparum* infection and involves malaria infection of the very small capillaries that flow through the tissues of the brain. This complication has a fatality rate of 15% or more, even when treated and is extremely serious.

Fogging -

Thermal fogging is a type of space spraying usually applied by handheld or shoulder carried pulse jet machines or a two stroke engine exhaust fog generator. Vehicle mounted fogging machines are also available.

Incidence Rate:

The number of new cases during a certain period (usually a week), divided by the total population exposed during the same period x 100 = incidence rate as a percentage

Number of new cases X 100

Total population exposed

Prevalence rate:

The number of cases both old and new occurring at a fixed moment in time divided by the total population and expressed as a percentage

Total number of cases X 100

Total Population

Recrudescence - a repeated attack of malaria (short term relapse or delayed), due to the survival of malaria parasites in red blood cells. Characteristic of *P. malariae* infections.

Recurrence - a repeated attack weeks, months, or occasionally years, after initial malaria infection, also called a long-term relapse. Due to re-infection of red blood cells from malaria parasites (hypnozoites) that persisted in liver cells (hepatocytes).

Relapsing malaria - Renewed manifestation (of clinical symptoms and/or parasitemia) of malaria infection that is separated from previous manifestations of the same infection by an interval greater than any interval resulting from the normal periodicity of the paroxysms

Residual treatment - treatment of houses, animal sheds, and other buildings where people or animals spend nighttime hours with insecticide that has residual efficacy. The goal of residual treatment is to block transmission by stopping human-vector contact.

Space Spraying – This may be done through thermal **fogging** on the ground or from aircraft. Space spraying must be restricted to an hour or two in the early morning or evening when the temperature is lowest and when thermal currents, which cause excessive dispersion of the insecticide, are at their lowest.

Splenomegaly - an enlarged spleen. A common finding in malaria patients that sometimes can be detected by physical examination. May occur in otherwise asymptomatic patients and is of use in conducting malaria surveys of a community, although it should not be the only factor considered when counting cases.

Stable Malaria – is characterised by a vector with frequent human biting habit and a high daily survival rate, environmental and climatic conditions favourable for rapid development of the parasite, normally high endemicity, *Plasmodium falciparum* prevalent parasite, high immunity in adults but may be low in children and pregnant women. Although there may be seasonal fluctuations in incidence these are not usually marked. These factors combined make epidemics unlikely but also makes malaria very difficult to control especially in rural areas. (see **Unstable Malaria**)

Temperature - the optimal temperature for development of *P. falciparum* is 30°C [86°F], while the optimal temperature for development of *P. vivax* is 25°C [77°F]. The time required for development of the sexual phases of the malaria parasite in the mosquito is 10-11 days at these temperatures.

Transmission – the passing of disease from one individual to another. In the case of malaria transmission is usually indirect requiring the anopheles vector to transmit the plasmodium parasite. Direct transmission may occur through contaminated blood or vertically from mother to foetus.

Unstable Malaria – is characterised by a vector with infrequent human biting habit and/or a low daily survival rate. The environmental conditions are not favourable for rapid development of parasite, endemicity is usually low to moderate and immunity variable with some groups with low immunity. There are usually pronounced seasonal changes in incidence. *P. vivax* is usually the main parasite. Epidemic outbreaks are likely when climatic or other conditions are suitable but control is also easier than in areas of **Stable Malaria**.

High risk groups

All refugees/displaced populations from a malaria free region entering an endemic area.

Certain groups whose work obliges them to stay in high risk areas such as forest fringes

Children under 5 years and pregnant women in endemic areas.

Vector Behaviour:

Anthropophilic – used to describe vector biting preference for humans

Zoophilic - used to describe vector biting preference for animals

Endophilic – vector that prefers to rest indoors

Exophilic – vector that prefers to rest outdoors

Endophagic – vector that prefers to feed indoors

Exophagic - vector that prefers to feed outdoors

General

“Outline Strategy for Malaria Control in Complex Emergencies”

by the Malaria Consortium for the WHO Roll Back Malaria (RBM)/
Emergency and Humanitarian Action(EHA).

“Partnerships for Change and Communication”

Malaria Consortium – WHO

Bruce-Chwatt’s Essential Malariology Third Edition

H.M. Gilles & D.A. Warrell

ITN

Insecticide Treated Net Projects - A Handbook for Managers”

By Chavasse,D. Reed,C. Attawell,K.

(Malaria Consortium, London School of Tropical Medicine and Hygiene,
DFID)

“Registration and Distribution - Working in Emergencies, Practical guidance from the field” Book 9 Oxfam.

Residual Spraying

Vector Control – Methods for use by Individuals and Communities

By Jan A. Rozendahl WHO: Geneva

Vector and Pest Control in Refugee Situations

PTSS/UNHCR & ISS/WHO April 1997: Geneva

Manual for Indoor Residual Spraying – Application of Residual Sprays for Vector Control

WHO: Geneva 2000

Emergency Vector Control using Chemicals: A handbook for relief workers

Christophe Lacarin and Bob Reed, WEDC, Loughborough

IEC

Buzzing Children: Living Health Reader, Damien Morgan: Macmillan: Hong Kong (available from TALC)

Child To Child – A Resource Book Part 2 Child to Child Activity Sheets,
The Child To Child Trust

Any Oxfam malaria control activities must be incorporated into the wider public health programme. However it is extremely important that they also fit in with the host country's national malaria strategy. The Ministry of Health should be responsible for malaria prevention and treatment policies that fit in with the WHO Role Back Malaria Initiative. Before beginning, any project it is necessary to have a Memorandum of Understanding, which stipulates any terms of collaboration.

In conflict areas where it is not clear whether there is a functioning MOH usually one UN organisation becomes the co-ordinating body (WHO, UNICEF, UNHCR)

POTENTIAL PARTNERS	Comments
Ministry of Health:	
Central level	Find out if there is a National Programme for Malaria Control. How does it fit in with RBM initiative. guidance and support for malaria control May co-ordinate control programme Technical assistance. Legislative +admin support Monitoring and evaluation
Provincial level	Co-ordination of all activities Technical assistance Supervision of district/municipality ?monitoring and evaluation
District /Municipal level	Local project development, co-ordination, supervision monitoring and evaluation
Health Centre/community level	Implementation of project activities partnerships Mobilise communities for participation Communication Monitoring
Other Government Institutions	
Provincial/district directorate/ department of Education	?mobilise education officials to include malaria activities in curriculum and stimulate other educational activities
Local administrations/localities	Introduce programme -assist in mobilising community participation
Other institutions and organisations	

WHO (Roll Back Malaria Initiative)	Co-ordinates global action to fight malaria Provides technical support and ensures partner governments adopt appropriate malaria control strategies
Malaria Consortium	Collaborative project of the Liverpool School of Tropical Medicine and the London School of Tropical Medicine and Hygiene. Co-ordinates with RBMI. Books /guidelines written by consortium.
UNICEF	Works in partnership with governments - funds some bed net distribution programmes
Tropical Medicine Institutes	Regions/countries doing own research etc
PSI (Population Services International)	Operates ITN social marketing programmes in Benin, Bolivia, Kenya, Malawi, Mozambique, Rwanda, Tanzania, Uganda, Zambia. Possible future countries: Cameroon, Côte d'Ivoire, India, Mauritania and Peru. Does monitoring and evaluation Develops clear simple instructions sheets in local languages with pictures on how to treat nets and overcome concerns about handling the insecticide.
NGOs International/national	Planning and Implementation for: Distribution of materials health education at community levels Formation of community councils, groups, activists. Education dissemination monitoring(including drugs) and evaluation Advocacy roles. Demand generation
Coalition group /community leadership	Mobilisation of community; distribution monitoring and evaluation; community decision making; referral systems
Community Partners: Includes community agents, village mobilisers, health and other activists form religious institutions, traditional healers and birth attendants etc	Communication and health education Mobilisation of community Distribution Monitoring and evaluation
Private sector	Buying and selling of Mosquito nets re-treatment materials and malaria treatment New technology Marketing/advertising
Mass Media	Disseminate key messages to sensitise, inform, educate and mobilise population

EXAMPLE MEMORANDUM OF UNDERSTANDING

MEMORANDUM OF UNDERSTANDING BETWEEN: OXFAM AND THE MINISTRY OF HEALTH REGARDING THE PROVISION OF INSECTICIDE TREATED MOSQUITO NETS (ITN)

Oxfam intends to work in partnership with the Ministry of Health in order to provide Insecticide Treated Nets (ITN's) to the following communities

.....
..... Individual households are expected to purchase the nets at a subsidised rate of \$..... The ITN's are intended primarily for pregnant women and children under five but each household will be allowed to purchase one extra net to be used for other family members. The ITN's will require retreatment every six months to maintain their full effectiveness and will also need to be repaired as necessary. It is expected that the nets will last at least three years but may last up to five years. Communities will need continued support to ensure safe and effective retreatment of nets but Oxfam is not in a position to support communities for longer than the length of the project (six months) and following this time it is expected that the Ministry of Health will continue to seek the means to provide ongoing minimal support to the above communities.

UNDER THE TERMS OF THE AGREEMENT THE MINISTRY OF HEALTH WILL HAVE THE FOLLOWING OBLIGATIONS:

STAFFING

The MoH will second three health promotion officers to the programme who will receive a stipend from Oxfam.

RETREATMENT OF NETS

The MoH agrees to support these communities to carry out subsequent retreatment of nets following Oxfam's withdrawal from the programme.

ONGOING SUPPORT

The MoH will lobby for the cancellation of import taxation on mosquito nets in order to make nets more affordable in the future.

PROVISION OF MALARIA TREATMENT SERVICES:

In line with current health policy, the MoH will ensure the timely delivery of essential malaria treatment drugs to health centres and clinics.

UNDER THE TERMS OF THE AGREEMENT OXFAM WILL HAVE THE FOLLOWING OBLIGATIONS:

COMMUNITY MOBILISATION & EDUCATION

Oxfam will work alongside village health committees to ensure they are in a position to administer the funds and keep accurate records of the sale of nets and when nets are due for retreatment.

Use of the nets will be promoted amongst pregnant women and children primarily but households will also be able to purchase one extra net if they so wish.

Oxfam will ensure that varied learning opportunities are provided to all community members to raise awareness about the prevention of malaria. In addition training seminars will be provided to committee members, village leaders and elders and volunteer health workers.

Oxfam will produce 20,000 leaflets on retreatment of nets and 1,000 posters on prevention of malaria. These materials will be designed in conjunction with the MoH.

ITN SUPPLY

Oxfam will source and supply 45,000 nets treated with deltamethrin insecticide

ITN RETREATMENT

Oxfam will provide retreatment kits and help to promote and organise the initial retreatment after four months in order to ensure that the project cycle can end on time.

In case of a deterioration in the security situation or during the period of heaviest rains, Oxfam reserves the right to cease all work. This work will be resumed as soon as conditions allow.

Both Parties reserve the right to sever relations if either side does not comply with the terms of the agreement or if materials supplied by either party are misappropriated.

SIGNATORIES OF THE AGREEMENT

Ministry of Health representative:

Oxfam Representative:

DATE:

SIGNS AND SYMPTOMS

UNCOMPLICATED MALARIA

Uncomplicated Malaria	Community Beliefs Tick what signs community associates with malaria
Main Signs:	
Fever	
Chills	
Sweating	
Other signs often seen:	
Headache	
Aches	
Joint pains	
Anaemia	
Jaundice	
Enlarged spleen or liver	
Add any other signs people mention:	

Complicated Malaria

Severe or Complicated Malaria	Community Beliefs Tick what signs the community associates with malaria
Main signs in addition to those for uncomplicated malaria:	
Coma	
Delirium	
Agitation	
Somnolence	
Convulsions	
Very High Fever	
Very Pale colour	

Much Vomiting	
Dehydration	
Little Urine of Dark colour	
Hypoglycaemia	
Haemoglobinuria	
Add below any other signs that people think of as severe malaria:	

Focus Group Discussion Framework

What are the most common diseases at present and which are the most serious?

Who gets these diseases? Men, Women, Young children older children?

What do you do when someone has Malaria/Fever/Fits? (find out if people classify these separately)

Who do you go to?

When do you go?

What do they do?

What do you do if this treatment doesn't work?

Do you give any home treatments? What are they – who do you get them from?

Is this what happens to all members of the family?

Is this what everybody does?

Who gets malaria?

What causes malaria? – (probe for other answers)

How can it be prevented?

At what time do mosquitoes bite most?

Do people use bednets here?

How much did they cost – how much do they cost now / are they available?

Do they dip them in anything?

Who uses them (how many in a family)– why do they use them – who do they use them for? Are there people or family members who don't use them – if not do they take any other precaution?

How long do they last – what happens when they get torn?

How often do you wash them?

Where and how do people sleep?

What time do young children go to sleep?

What time do adults sleep and get up?

MALARIA ASSESSMENT SPECIALIST

Key Activities

To work with Oxfam's Public Health team to assess the specific risks associated with malaria in the area of operation

In conjunction with the central and local MoH personnel assess possible effective responses which may help to prevent malaria epidemics in the region taking into account the limited resources of both the MoH and Oxfam.

This may include:

- Selective residual spraying
- Use of larvicides
- Distribution of ITN's to targeted groups (possibly as a trial in limited areas)
- Use of environmental control methods

Or a combination of the above methods

- Liaise with the National Organisation for the control of malaria and other vector borne diseases (NOCMVD) and the regional malaria control departments to determine their malaria control policy for the country and areas of priority need
- In conjunction with the Public Health Specialist and the MoH assess the provision of essential malaria control drugs to clinics to ensure that limited resources are used most effectively to address the most significant problems
- Make recommendations for monitoring and evaluation of any malaria control project and if necessary conduct training which will enable this to be carried out
- To contribute to the writing of proposals and developing budgets to procure funding for proposed malaria control activities, which will be identified during the assessments.
- To ensure that all work is carried out in a way that is sensitive to community needs and gender issues.

- To produce written recommendations for the development of the programme by the end of the contract period

Key competencies

- Expertise in vector and especially malaria control
- Experience of carrying out public health assessments in emergency situations
- Experience of planning, implementing and malaria control activities.
- Ability to liaise effectively and appropriately with partner agencies
- Overseas experience is required, covering both relief and development work in different locations.
- Ability to represent Oxfam to other agencies and to contribute towards the co-ordination of the response with other relevant agencies
- Well developed analytical, assessment and planning skills.
- Good oral and written reporting skills.
- Diplomacy, tact and negotiating skills.
- The capacity to remain calm under pressure, flexible to respond to changing needs yet not lose sight of strategic priorities. Must be organised and efficient.
- Ability to work as part of a team.
- A good understanding of relief and development issues.
- Commitment to humanitarian principles and action.
- Commitment to Oxfam's equal opportunity and gender policies.

Malaria Control: Public Health Promoter

Key Activities

- Plan and implement a community mobilisation and education programme in the project area ensuring an empowering approach to working with communities on malaria prevention and control
- Organise and implement the collection of baseline data for the malaria control project. This will involve collecting qualitative and quantitative data using participatory methods
- Continue to assess the public health needs of the community to ensure that the malaria control intervention is appropriate and that water and sanitation needs and issues are also addressed as necessary
- Ensure that a logical framework is used for planning the programme and that this is regularly updated to respond to identified needs
- Ensure that regular monitoring of the programme is carried out against agreed objectives and that both process and impact are adequately monitored
- In consultation with the programme manager, identify training needs within the team and in the community and design and implement training programmes as required ensuring that evaluation of training is conducted
- Ensure regular liaison with the representatives from the National Malaria Control Programme to ensure that the project is in keeping with their longer term goals for sustainable malaria control
- Ensure regular liaison with other agencies involved in health and malaria control
- Write regular reports adhering to OGB reporting formats at intervals to be decided by the programme manager (at least monthly). A final report must be completed before debriefing.
- Represent OGB in co-ordination meetings with the government and other key players as requested
- Ensure that all work is carried out in a way that is sensitive to community needs and gender issues. In particular to promote the full and equal participation of women in all aspects of the work and to ensure that Oxfam's Programme is an opportunity for peace making, rather than community division.
- Ensure that work aims to meet Minimum Standards and adheres to Oxfam's emergency guidelines and protocols

Key Competencies

- Knowledge of public health and one or more other relevant areas (e.g. health promotion, community development, education, community water supply). Technical knowledge of malaria is not required but an aptitude and enthusiasm to learn is preferred.

- The post holder should have at least two years practical experience in developing countries in appropriate community health programmes. Some of this time should have been in emergency relief programmes.
- Experience and understanding of community mobilisation in relation to malaria control and water and sanitation activities
- Understanding of international health and development and relief issues
- Sensitivity to the needs and priorities of disadvantaged populations
- Assessment, analytical and planning skills.
- Good oral and written reporting skills.
- Diplomacy, tact and negotiating skills.
- Training/counterpart development skills.
- Good communication skills and ability to work well in a team
- Ability to work well under pressure and in response to changing needs.
- Good written and spoken English essential.
- Commitment to equal opportunities and gender equity

MALARIA QUIZ QUESTIONS

The following quiz can be used as a training tool for Public Health Promoters or modified for use with community mobilisers.

1. Malaria is transmitted by a male anopheles mosquito
True False

2. How many different types of malaria are there?

3. What is the organism that causes malaria?

4. Vertical malaria control programmes are a new approach to malaria control
True False

5. In 1998 WHO introduced a new strategy to address the problem of malaria – what is this new strategy called?

6. Pregnant women should take malaria prophylaxis during the whole of their pregnancy
True False

7. Cerebral malaria only affects young children and pregnant women
True False

8. It is better to take at least half the treatment dose for malaria than none at all
True False

9. Residual spraying prevents malaria by killing all mosquitoes
True False

10. Pregnant women and children are more at risk from malaria in _____ than other groups
True False
11. What are the main malaria vectors in _____?
12. What is the recommended first line treatment for malaria in _____ and in what dosage?
13. The most effective method of malaria control is the use of Insecticide treated bednets?
True False
14. There are over 350 species of anopheles mosquitoes
True False
15. Malaria is responsible for 1.5 – 2.7 million deaths world wide each year
True False
16. In subsaharan Africa there are approximately 270 - 480 million cases of malaria each year
True False
17. What are the main species of malaria in _____?
18. Malaria is easy to diagnose and can be done in all clinics and health centres
True False
19. A malaria vaccine will soon be available
True False

20. Most adults from Sub Saharan Africa have developed life long immunity to malaria

True False

21. Why can treatment for malaria fail? (give as many reasons as possible)

22. _____ is an area of stable malaria transmission

True False

23. What methods can be used to protect yourself from malaria? (give as many methods as possible)

24. Severe, life threatening malaria is usually caused by one particular type of malaria

True False

25. Insecticide treated bednets need to be reimpregnated every three months

True False

26. How do ITN's protect people from malaria?

27. Which groups should be targeted for the distribution of insecticide treated bednets?

28. Why might bednets fail to protect people from malaria? (give as many reasons as possible)

29. How can people get rid of mosquito breeding sites?

ITN Monitoring Form

This rapid assessment might be carried out following the distribution of ITNs.

1. How many children under five and pregnant women in the household?
2. How many bednets did you receive?
3. How many bednets are being used? (Observation)
4. Was the distribution carried out fairly?
5. What do you know about these nets? (record as many things as possible)

The following Malaria Lessons were developed in Mozambique by World Relief for use with groups of mothers. They can be adapted to different situations and to different target groups.

These lessons are specifically designed for field workers to teach mothers in rural areas about how to prevent and treat malaria.

From the lessons you should fully understand the following:

- **The lessons will teach how malaria is caused, how we can prevent and treat malaria and how to recognise the signs and know the risks of malaria. Speak clearly to the mothers so that they can all understand.**

The purpose of this project is to reduce by 50% the numbers of children < 5 years dying from malaria.

Two important ideas from this project are:

1. If children aged between 0-59 months get malaria, they must be treated the same day that they begin feeling ill.

2. Once the child no longer has malaria the mother must give the child good wholesome food for the next two weeks.

LESSON 1

THE CAUSES OF MALARIA

TIME Two hours

METHODS OF TEACHING

Discussion

Questions

Games

GROUPS

Community activists

Volunteers

Mothers

BEFORE STARTING

Greet the group of mothers

Arrange them in a semi-circle around you

Begin with the lesson.

GAME USING ORANGES & PINEAPPLES:

(explain clearly about this game)

Getting to know each other.

Make sure the mothers are comfortable, talk clearly and make yourself understood. When the game is over, all the mothers should know the names of all the other mothers.

- When the mothers know each other, they will feel more comfortable to express their views and ideas.

TIME: 15 minutes

1. The mothers will tell the two mothers sitting next to them their name – saying “My name is”.
2. Explain to the mothers about the orange and pineapple (if the mothers do not know about oranges and pineapples use other fruit that they do know – make sure they understand the game).

The mother on the left is pineapple; the mother on the right is orange. Say orange or pineapple to each mother and they must say the name of that mother. Get all the mothers to change places occasionally. Once everyone knows each other’s name, start the lesson.

Objectives

When the lesson is finished the mothers will know about the following:

There are a lot of mosquitoes during the rainy season.

During the summer there are a lot of mosquitoes, which is why a lot of people suffer and die from malaria.

Malaria kills – you must use all the methods you can to prevent your family from getting malaria.

GOOD MESSAGE:

You must prevent mosquitoes biting because they transmit malaria!

When the mothers have fully understood and repeated the objectives continue with the lesson:

QUESTION 1

What happens after there has been a lot of rain or after the floods?

Get only one mother to answer at a time.

ANSWER

MOSQUITOES

QUESTION 2

Explain everything that you saw during the floods and for a few months after.

ANSWERS

Lots of things were happening:

- There was a lot of rain and everywhere flooded.
- Rivers, borrow pits, puddles and ponds became full of water.
- After three weeks we saw a lot of mosquitoes.
- After the fourth week we saw people becoming sick with malaria.
- The numbers of children dying from malaria was much higher.
- We also began to see a lot of flies as well.
- A lot of people also become sick with diarrhoea.
- The numbers of children dying from diarrhoea was also high.
- There was a rumour going round that a lot of children were dying because of witchcraft.
- Other things were happening...tell us more.

QUESTION 3

So what can we learn about the events that happened during and after the floods?

Give us your ideas.

ANSWERS

We can learn about two diseases together:

MALARIA SICKNESS

- There is a lot of water about and lots of mosquitoes are born.
- We see a lot of mosquitoes and a lot of people sick with malaria.
- We see a lot of malaria sickness and a lot of children dying.

DIARRHOEA SICKNESS

- Dirty water causes diarrhoea sickness.
- If there is a lot of rubbish around water they attract flies.
- The flies transmit the diarrhoea sickness.

- Diarrhoea sickness kills – especially in children.

THE RISKS OF DRINKING WATER FROM BORROW PITS / PONDS

- Drinking borrow pit or pond water without boiling it first causes diarrhoea.

QUESTION 4

What sicknesses do we see after there has been a lot of rain or flooding?

ANSWERS:

We saw two types of sickness:

- Malaria
- Diarrhoea

* we also saw a lot of children dying.

QUESTION 5

So what can we do to prevent these two types of sickness when there is a lot of rain or if it floods again?

ANSWERS:

We can prevent the sickness by the following methods:

Preventing a lot of mosquitoes

- Cover up open holes near your house.
- Prevent you and your family from getting bitten by mosquitoes.
- If someone in your family has a hot body, sponge them with tepid (not hot, not cold) water.
- If someone in your family has malaria sickness, don't waste time; go straight to the hospital the same day that they begin feeling ill especially if they are young or pregnant
- If the person is still sick after you have been to the hospital you must go back to the hospital and explain to the doctors and nurses that the person has not got better.
- If you see signs of malaria, don't waste time go straight to the hospital.

* - These are the best ways of making sure we reduce the numbers of children dying from malaria by 50%.

Preventing diarrhoea

- Throw away dirty water properly.
- You must clean all animal and human shit from your yard.
- When the children have diarrhoea, make sure they have plenty of sugar/salt solution, give them breast milk and keep offering them food.
- If they don't get better, take them to the hospital.

Once you think the mothers have heard clearly and fully understood the lesson, do the following examination. Help those mothers who have not understood.

EVALUATION

Ask the mothers the following questions:

1. What have you learnt from today's lesson?
(Get the mothers to give their ideas, make sure they speak clearly and everyone understands them)
2. Why do lots of children die during the summer or when there has been a lot of rain or flooding?
(Give the mothers time to give their answers, making sure they speak clearly).

FINALLY

Close the lesson.

You must arrange the next time and place that you can meet for the next lesson.

LESSON 2

THE METHODS OF PREVENTING MALARIA

TIME: Two hours

METHODS OF TEACHING: -

Discussion

Questions & Answers

Pictures

Games

GROUPS:

Animadores

Volunteers

Mothers

BEFORE STARTING:

Greet the group of mothers

Arrange them in a semi-circle around you

Begin with the lesson

Objectives

When the lesson is finished the mothers will know about the following:

The causes of malaria.

The methods of preventing malaria

When the mothers have fully understood and repeated the objectives continue with the lesson:

QUESTION 1

What are the causes of malaria sickness?

(Give the mothers the chance to talk to each other and discuss this question)

ANSWERS

Malaria is caused by a parasite, which is transmitted by mosquitoes when they bite and take blood.

QUESTION 2

How can someone get malaria?

ANSWERS

Someone gets malaria when mosquitoes bite them.

The mosquitoes first bite someone who is sick with malaria.

The mosquito then goes and bites someone who is not sick with malaria and transfers the parasite.

Within two weeks usually the person who has been bitten becomes sick with malaria.

QUESTION 3

When do we usually see a lot of mosquitoes?

ANSWERS:

We see a lot of mosquitoes during the summer.

When it is hot and after it has rained a lot.

When the rivers and ponds are full of water.

QUESTION 4

When are the mosquitoes happy to be born?

ANSWERS

(Use the picture to explain when mosquitoes are born)

Mosquitoes are happy when:

There is a lot of water and when it is hot
They like to rest under small trees where it is cool
Mosquitoes like to lay their eggs when it is sunny.
The mosquitoes quickly break out of their eggs when it is hot
During the summer when it is hot.

(These are the reasons why there are a lot of mosquitoes).

SHOW THE MOTHERS SOME ANOPHELES LARVAE and ask if they have seen a lot of these where they live

QUESTION 5

So what can you do to prevent mosquitoes?

ANSWERS:

All the families must keep their yard clean from rubbish

Dispose of dirty water properly and burn rubbish

You must cover up all the open holes near you because when it rains they will fill up with water.

QUESTION 6

What can you do to prevent you and your family from becoming sick with malaria?

ANSWERS:

Make sure children and pregnant women sleep under the bed net.

If possible use mosquito spray to get rid of the mosquitoes.

Cover yourself up when it gets dark

- Cover the children when it goes dark

When you have made sure that all the mothers have understood the lesson we can begin with the game.

Show the mother the game and make sure she understands how to play

Give them five minutes to understand then start the game.

(When the game is finished, you must say thank you to the mothers).

The game is as follows:

Time: 30 minutes

Choose mothers who are happy to play the game.

We need a family with:

Father

Mother

Happy Children.

We need a family with:

Father

Mother

Children sick with malaria

Somewhere where there are a lot of mosquitoes

Mosquitoes that are transmitting malaria.

A boy who is looking after cattle and other animals.

Ask the happy mother to explain to the other mothers why she is happy and why the other mother is not happy. If she has forgotten anything, ask the other mothers to come up with ideas.

EVALUATION

Ask the mothers the following questions:

Give the mothers chance to talk and express their views

QUESTIONS

1. What causes malaria?
2. Do more people get malaria in the summer or the winter?
3. What can we do to prevent getting malaria?

FINALLY

Get the mothers to sing song number one.

Close the lesson.

You must arrange the next time and place that you can meet for the next lesson.

LESSON 3**BED NETS**

The purpose of this lesson is to teach how we can use bed-nets.

Objectives

Why it is good to use a bed net

How to use a bed net correctly

Why we need to treat our bed nets with special medicine.

THE FOLLOWING QUESTIONS GO WITH PICTURE 1.

Show the mother picture 1 then ask them what they can see before asking the questions.

QUESTION 1

Why is it good to use a bed net?

ANSWERS:

Because:

- The bed nets stop the mosquitoes from biting us and giving us malaria.
- We can get a good night's sleep.
- The bed net kills fleas and flies and other insects we don't need.

QUESTION 2

How do bed nets stop us from getting malaria?

ANSWERS:

- Because only mosquitoes transmit malaria.
- The mosquitoes bite us during the night whilst we are asleep.
- Bed nets stop us from getting bitten by mosquitoes transmitting malaria.
- If we don't get malaria, we don't have to find money to buy tablets to treat malaria.

QUESTION 3

Who is most at risk of getting bitten by mosquitoes and dying from malaria?

ANSWERS:

- Pregnant women and children under five years are most at risk, so if there is only one net they should use it.
- If there are two nets, the other members of the family should sleep under it to stop the mosquitoes from biting them and giving them malaria

THE FOLLOWING QUESTIONS GO WITH PICTURE 2

Show the mothers picture 2 and ask them what they can see before asking the questions.

QUESTION 4

When should we use our bed-nets?

ANSWERS:

- We must use the net every night, all throughout the year

QUESTION 5

Why do we treat bed-nets with special medicine?

ANSWERS:

- The medicine on the bed-nets will scare away or kill all the mosquitoes
- The medicine also kills fleas, flies, lice, bedbugs and cockroaches.
 - If we don't have the medicine the mosquitoes will still make a lot of noise in our ears and we will not have a good sleep.

QUESTION 6

Why are bed-nets not good?

ANSWERS:

- When it is very hot at night, the nets make it hotter – but we must still use the net. To make it cooler we can take off the blankets and just use a capelana.
- We cannot smoke under our bed-nets

QUESTION 7

How can we still get malaria even if we use a bed-net?

ANSWERS:

- If we don't tuck our bed-nets under our mattress or sleeping mat the mosquitoes can get inside and we can get malaria
- We must hang the nets properly so that the sides of the net don't touch us.

- We must mend the holes in the net with our mending kits to stop the mosquitoes getting in our nets and giving us malaria.
- We must be careful not to sleep against the net otherwise the mosquito may be able to bite us and give us malaria.
- We must put a stone in each of the four corners

QUESTION 8

How can we hang the bed nets?

(Show the mothers how to use the bed nets)

ANSWERS:

1. Tie the string from the bed net to the top of the house
2. Make sure that the net is tucked underneath the bed/mattress;
3. Put 4 stones in each corner.

QUESTION 9

What sorts of bed nets are there?

ANSWERS:

There are two types of bed net:

1. **Rectangular** – These can be attached to each corner of the house with string. These are good for children and other people that they sleep with.
2. **Conical** – These can hang over the bed and are attached to the house at a single point over the bed/mattress. Three people can sleep inside, (mother, babies and father).

THE FOLLOWING QUESTIONS GO WITH PICTURE 3

Show the mother's picture 3, ask them what they can see before asking the questions.

QUESTION 10

When can we wash our bed nets?

ANSWERS:

When the medicine on the bed nets no longer has the power to kill mosquitoes we must wash the bed net with more of the special medicine.

QUESTION 11

When should we re treat our bed nets again?

ANSWERS:

- When the rains arrive at the start of October, we treat our bed net again with the special medicine.
- We must treat the net with the special medicine every 4-6 months.
- If the bed net is not re treated with the special medicine, the mosquitoes will bite us and we can get malaria.

QUESTION 12

Why must we be careful with the medicine for the net?

ANSWERS:

- The medicine can kill when someone drinks it.
- If must not wash our bed nets in the rivers or ponds otherwise the medicine will go in the water and kill all the fish.
- After we have re-treated our nets we must throw away the spare medicine in a latrine.

LESSON 4

TREATMENT OF MALARIA

TIME : Two hours

METHODS OF TEACHING: -

Discussion

Questions & Answers

Pictures

GROUPS:

Animadores

BEFORE STARTING:

1. Greet the group of mothers
2. Arrange them in a semi-circle around you
3. Begin with the lesson.

Ask the mothers about the three lessons they have already had, make sure that they have no problems and make sure that they have not forgotten anything that they have learnt. Once you are satisfied they have understood everything, proceed with the next lesson.

PURPOSE OF LESSON:

By the end of the lesson the mothers will know:

- How to recognise the signs of malaria
- How to treat the malaria sickness

GOOD MESSAGE:

Give chloroquine on the first day that someone gets malaria and continue for the next two days.

QUESTION 1

Are a lot of people suffering with malaria in this rural area?
Yes or No?

QUESTION 2

What are the signs for the malaria sickness?

ANSWERS:

Some of the signs of malaria are as follows:

- Headache
- Body is cold
- Body is hot
- Vomiting
- No appetite

(May be others – ask mothers)

QUESTION 3

How can we treat malaria?

QUESTION 4

What causes malaria?

(Explain the cause of malaria by showing the picture of the mosquito on today's lesson).

Give the mothers time to discuss how they can treat malaria and how it is caused.

Tell the mothers the story about the two mothers, mother Maria and mother Joana. Show the picture whilst telling the story.

Picture 1

- Mother Maria is the mother living in this rural area. Like many other mothers in the area she is leaving her house to go and work in the field. Paito her child has a very hot body, he has been suffering all night and didn't get a good sleep. The child was crying and had no appetite for food. In the morning Maria felt her son's body and it was still hot.

Picture 2

- Although Paito was feeling ill Maria carried on with her work and went to the fields leaving Paito with her sister. Paito's body gets hotter and Paito begins having convulsions, he is very ill. Meanwhile, Maria is still working in the field.

Picture 3

- When mother Maria returns from the field she finds her son having convulsions. She quickly throws down her hoe and all the food she has brought back and quickly takes off her clothing.

Picture 4

- She covered her child with her pants and she starts to bang a plate near Paito's ears to wake him up like the witchdoctor said. But nothing happened; Paito never woke up, Paito was dead. – Show **Paito's grave in picture 5.**

Ask all the mothers if they understood what mother Maria did wrong.

Ask two of the mothers to try and explain about mother Maria's story.

Once this has been done, ask the following questions:

QUESTION 5

Do you know other mothers in our rural area that treat sickness like mother Maria treated it?

QUESTION 6

What caused Paito's death?

QUESTION 7

What do people in your rural area think causes convulsions?

Give all the mothers time to explain their views. Now all the mothers will know about the importance of treating malaria and convulsions.

Now tell the story about mother Joana.

(Use pictures to tell the story)

Picture 1

The mother we can see in the bottom pictures is mother Joana. She is also living in the same rural area as mother Maria. Every morning she wakes up very early, about 4 o'clock to go and work in the fields. One day Maezinha's body was hot all night. She had not slept and she had been crying all night and didn't have any appetite. In the morning mother Joana felt her daughter, Maezinha's body – it was very hot, just like it had been during the night. Mother Joana decided that because Maezinha was ill she would not go to the fields.

Picture 2

Mother Joana decided that she needed to make Maezinha feel colder and reduce the fever. Joana took some clothing and put them in tepid water. She then covered Maezinha with the clothes and poured water over her body until the fever came down. After that she took the child to the hospital.

Picture 3

When mother Joana reached the hospital she found the nurse whose name was Father Mandlhate. The nurses checked Maezinha and gave Joana some tablets for Maezinha to take; chloroquine and paracetamol. Father Mandlhate told Joana when they should be taken:

CHLOROQUINE – give one tablet on the first day, then one tablet on the next two days. (three days)

PARACETAMOL – She must give aspirin three times a day until they are finished.

The nurses also checked for signs of other illnesses like:

- Anaemia
- High fever / Pneumonia

The nurse told mother Joana that if her daughter was not better after three days and Maezinho still showed signs of malaria she must go back to the hospital. She was also told to give Maezinha plenty of good food

Mother Joana did everything that the nurses told her to do. Maezinha started to feel better after a couple of days. She had no regained her appetite for food but Joana forced Maezinha to eat as much food as she could. Joana also gave her plenty of water to drink.

Mother Joana did not go back to work in the field until her child was feeling better and she had followed what the nurse had said. Now she could go back to working in the fields.

Now Maezinho felt much better thanks to her mother who stayed at home and followed the nurses instructions..

Picture 4

We see Maezinha. When you see the signs of malaria, you treat quickly and properly, making sure to give all the tablets so that Maezinha can get well soon.

Ask the mothers if they have heard and understood mother Joana's story clearly.

Ask two of the mothers to try and explain the story of mother Joana to the other mothers. The other mothers can help if that mother forgets anything.

Now ask the following questions.

QUESTION 8

What is the difference between the two mothers?

(Give the mothers plenty of time to discuss their ideas and the differences between the mothers)

QUESTION 9

What is the best treatment for malaria?

FINALLY:

Get the mothers to sing one of the songs related to the lesson.

Close the lesson.

You must arrange the next time and place that you can meet for the next lesson.

LESSON 5

THE RISKS OF MALARIA

TIME

Two hours

METHODS OF TEACHING

Discussion

Questions

GROUPS

Animadores

Volunteers

Mothers

BEFORE STARTING

Greet the group of mothers

Arrange them in a semi-circle around you.

Before the purpose of today's lesson

Tell the mothers the good message:

GOOD MESSAGE

The mothers must quickly take their children to hospital when they start feeling sick with malaria.

Objectives

By the time the lesson has finished the mothers will know the following:

Know the signs and risks of getting malaria

What to do when you see the signs of malaria

Know who are most at risk of getting malaria

QUESTION 1

What are the risks of having malaria?

ANSWERS

Malaria sickness can cause the following risks:

- There is little blood in the body
- Convulsions
- If the mother is pregnant she is in danger of dying along with the baby
- Someone can die if they don't get the tablets they need.

QUESTION 2

Of all the people who live in this rural area, who is most at risk from malaria?

ANSWERS:

It is the children under five years and the pregnant mothers.

QUESTION 3

Why do you think people are in danger when they get malaria?

ANSWERS:

Because in children under five it is hard to prevent sickness:

- If the child is not getting enough good food, they can get sick easily.
- Small children do not have much blood so when they get ill with malaria it affects them the worst.
- Because young children can't explain when they start feeling ill, it is up to the mother to watch their children carefully.

Pregnant mothers are also at great risk when they get malaria:

- The mother has to share her blood and protection with her baby
- A mother who is pregnant for the first time is at greater risk from malaria than a mother who is pregnant for the second time.

Pregnant mothers are at the following risks from getting malaria:

- The baby inside the mother will be getting blood that has the malaria;
- The baby may be born before it should be;
- The baby may be born dead;
- If the baby survives it may be born too weak and small to survive;
- If the mother gets malaria, there is not enough blood for her as she shares it with her baby
- The mother can die.

QUESTION 4

How can you tell that your children do not have enough blood?

ANSWERS:

- Open your child's eye
- Look under the eye
- If the eyelids look white then the child does not have enough blood
- When it is red then the child has enough blood.

Pair the mothers up:

- Get the mothers to look in each other's eyes.
- Teach the mothers to know if someone is short of blood.

Close the lesson after you have carried out the following evaluation

EVALUATION:

- What are the good messages that you learnt today?

- What can you do to help the pregnant mothers and children under five years?
- How can the mothers tell if their children don't have enough blood?
- Why must the mothers quickly take their children to hospital?

Repeat some of the evaluation questions from previous sessions to see how much people have remembered.

FINALLY:

Get the mothers to sing one of the songs about malaria

Close the lesson

Malaria Songs

SONG ABOUT MALARIA (1)

1. The mother's must know that malaria
Is a bad thing in the village (2 x)
A bad thing

2. When the children's body is hot
Without flu no diarrhoea (2 x)
Is malaria

3. When the children's body is hot
And convulsions also
Is malaria

4. Mothers give Chloroquine
Quick give Chloroquine (2 x)
Chloroquine

5. After three days
If not better take back to hospital (2 x)
To hospital

SONG ABOUT MALARIA (2)

1. Sick from malaria
Sick from malaria
Sick from malaria
Is bad for the family

2. Especially in the night
Especially in the night
Especially in the night
In the children's head

“CHORUS”

Kill the mosquitoes
Kill the mosquitoes
Kill the mosquitoes
The cause of malaria. (2 x)

3. Use bed nets (3 x)
Where the children sleep

4. Cover up the holes (3 x)
In our yards
In our village

5. When the children have malaria (3 x)
Take them to hospital
Give them food

6. When the children are well (3 x)
Give them good food and drink

SONG ABOUT MALARIA (3)

1. **Lets go**
 Lets go to finish with malaria once and for all (2 x)

2. **Malaria kills**
 Lets go to finish with malaria once and for all (2 x)

3. **Children die**
 Lets go to finish with malaria once and for all (2 x)

4. **Kill the mosquitoes**
 Lets go to finish with malaria once and for all (2 x)

5. **Fill the holes**
 Lets go to finish with malaria once and for all (2 x)

There were once two families living in one particular village in rural Chokwe, Maria's family and Joana's family. Both families had recently got bed nets and had been shown how to use them correctly. During the cold dry season both families had used their bed-nets, the nights were cold and the nets made them warmer.

It was August and the nights were much warmer now. It was becoming very warm to sleep under the nets, and soon it would be too warm.

Maria remembered what she had learned from the training session. Once the warmer nights arrived she could still sleep under her bed nets outside. She remembered to take the blankets off herself and her children to make them cooler and remembered to use the nets. None of Maria's family got malaria that year and were very pleased that they had a bed net. They had saved a lot of money not having to buy tablets and they used the money to buy seeds. As their family were not ill all of them could work in the fields. Once April arrived they remembered to re treat their nets and have done every six months ever since.

However, Joana's family decided that it was too hot to sleep under the nets and they did not remember what they had learned about removing blankets. Instead Joana's family slept without the nets and only slept under the net when it was cool enough. Instead the net sat in the corner of the room until one day Joana's son, Domingos decided it would be great to use the net to catch fish.

Domingos had forgotten that the net contained medicine that was poisonous to the fish. All the fish died and because they were full of poison they could not eat them. The same water they used for fishing they also used for drinking. They now have to go 2 kms to find water. The children became weak, two of them were suffering from malaria and all of them were hungry. There was no fish, not enough seed to grow because they had spent all their spare money on tablets. Joana was now pregnant, she and her baby were in great danger of getting malaria. Joana's youngest child died shortly after and so did her baby.

It was not a good year for Joana, she had now learned from her mistakes. She should have used her bed net every night, even when it was really hot. She managed to save money to buy another bed net as her original net was now ruined. The following year all of Joana's family used the net, none of them got malaria and they began to save money which they could spend on seed, and they were all much happier.

art III

resources

THE IDEA

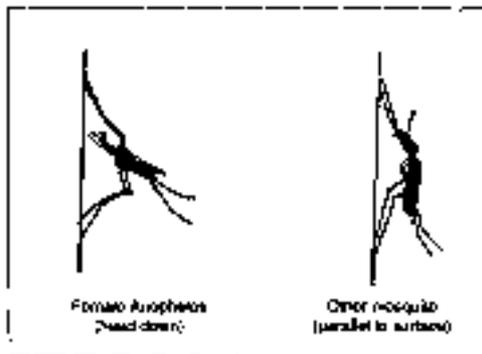
Malaria is a killer disease. One million children die of it every year. The disease leaves many others weak and unable to work or study properly. Malaria is spread by Anopheles mosquitoes and affects people in many countries. It is even coming back to countries from which it has been driven out. There are important government programmes to control malaria and we all need to work together to support these and prevent malaria from spreading.

Children can also help by preventing mosquitoes from breeding and biting people, and by knowing what to do when someone has malaria.



Malaria: Some important facts

What causes us to become ill? The germ which causes malaria is called Plasmodium and it is carried by the female Anopheles mosquito. Other mosquitoes do not carry malaria, but they are a nuisance and may carry other diseases such as dengue fever.



Anopheles mosquitoes can pick up the Plasmodium germs by biting people who have malaria. The germs develop inside the mosquitoes and are then passed on to another person.

When the female Anopheles mosquito bites a person, the malaria germ enters the person's blood. It travels to the liver and then back into the blood. This takes about 12 days. Then the person begins to feel unwell and gets fever, often with sweating, shivering, headache and diarrhoea. This fever passes, but keeps coming back, and may get worse unless it is treated with the correct medicine. It is very dangerous for young children and for pregnant women.

Health workers can test for malaria. They take some blood from the sick person, spread it on a glass slide, and look at it through a microscope. If there are Plasmodium germs in the blood, the health worker will be able to see them.

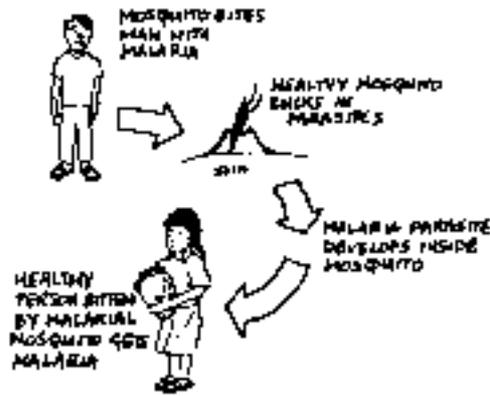
The more bites you have, the more chance there is that one of them will be by a female Anopheles mosquito which is carrying the Plasmodium germ.

Where and how these activities have been used

In countries where Malaria is common, this sheet is always a priority, but use will vary widely depending on the local situation **which always needs to be checked with the health worker**. For example, it is useful to know:

- What kind of malaria is present? How serious is the problem?
- What are the prevention programmes in the area? How can children help?
- How much protection do people have, and how much can they afford (e.g. nets, window netting, sprays)?

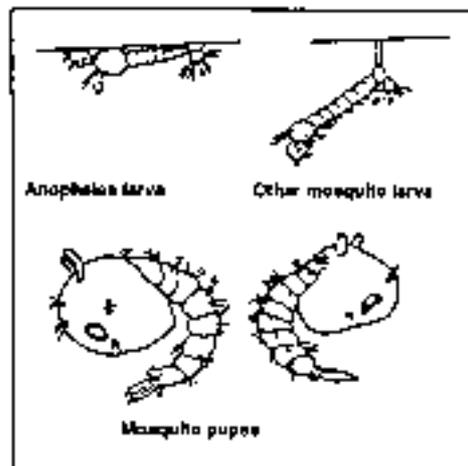
Although older children may take some responsibility for younger ones, e.g. protecting them at night, most action here is taken by children working together. It is important for children with adults to work out realistic things to do and, if possible, ways in which they can see results, e.g. less mosquitoes, less malaria.



The life of the Anopheles mosquito

Female Anopheles mosquitoes lay their eggs in still water, such as puddles, ditches and ponds. After the rainy season, there are many more mosquito breeding places, and therefore more malaria. Other mosquitoes breed in places like latrines, cesspits and even water pots. The Anopheles mosquitoes don't usually breed in these places.

Mosquito eggs are small and black and float on the water. They hatch into larvae which grow quickly. The larvae of the Anopheles mosquito float parallel to the surface of the water. The larvae of other mosquitoes hang at an angle from the surface of the water.



After about a week the larvae of both kinds of mosquitoes turn into pupae. After another day or two the pupa becomes a mosquito which is ready to fly away.

The adult Anopheles mosquito hides in cool dark places during the day. The female bites during the night, and sucks up blood to mature her eggs.

How we can prevent malaria

To prevent malaria we must stop Anopheles mosquitoes from biting people.

Keeping mosquitoes away

If possible, the windows, doors and other openings in a house should be screened, so that mosquitoes can't get into the house. The best way to prevent mosquitoes from biting at night is by sleeping under nets.

These nets must be: put over the bed before dark.

- tucked in well after you get into bed.
- kept in good repair by sewing up any holes or tears.

Remember:

- Mosquitoes can bite through the net if you sleep close to it.
- Mosquitoes go on biting until it is light. Stay under the net until it gets light.

In some countries nets are now being treated with a chemical called **permethrin**. These nets are the best defence against malaria. They help keep mosquitoes away and may kill them. Even if there are holes in the nets, mosquitoes may be killed as they try to find and get through them. This helps to keep the mosquitoes away and can kill them.

In the evening, at night, and until the first light of day, as long as the mosquitoes are active, we can wear clothes which cover the arms and legs to protect them from mosquito bites. In places where there are no nets or screens, a blanket or thick cloth can help protect the body.

Mosquitoes can also be driven away by putting a repellent on skin or clothes (especially around the ankles), by using mosquito coils, or even smoke from grass or leaves.

Killing mosquitoes

We can also kill mosquitoes when they get into the house. Regular government spraying programmes are very helpful, and everyone should cooperate with these. When the walls of the house are sprayed, the insecticide should be allowed to remain on the walls. Mosquitoes resting on the walls will then die.

Preventing mosquitoes from breeding

We can also try to stop Anopheles mosquitoes from breeding by:

- filling up puddles of still water around the house with earth and stones.
- putting small fish which eat larvae into ditches and ponds.
- putting oil on the surface of small ponds to stop the larvae from breathing.

Other mosquitoes can be prevented from breeding by carefully covering water pots and containers with cloth, or by putting oil or special chemicals into latrines.

If a child has malaria

A child with malaria needs to be treated, or the disease may get worse and the child could even die. Wherever malaria is common, a child who has a fever should be taken immediately to a health worker. If malaria appears to be the cause, the child should be given a full course of an anti-malarial drug.

A child with a fever believed to be caused by malaria should be given a course of anti-malarial tablets (young babies may be given an anti-malarial syrup). Treatment for malaria should begin immediately. Even a day's delay can be fatal. A health worker can advise on what type of treatment is best and how long it should last.

A child should be given the full course of treatment, even if the fever disappears rapidly. If the symptoms continue, the child should be taken to a health centre or hospital - the malaria may be resistant to the drugs.

A child with fever caused by malaria needs to be kept cool but not cold. Sponge the child's body with cool water.

Sometimes the child will be shivering. But putting too many clothes or blankets on a child with a high fever or at the shivering stage of an attack of malaria is dangerous. Medicines like paracetamol can reduce the temperature.

When children sweat, they lose liquid. They should be given plenty to drink. As soon as they can eat again, they should be given food to build up their strength (see Activity Sheet 6.2, Caring for Children Who Are Sick).

ACTIVITIES

Finding out

Where is malaria common? Some government programmes have managed to control malaria in some places, but in others malaria is spreading. Find out where malaria is most common in the world, in your country, in your district. Ask teachers, health workers or local malaria control officers. Is it spreading or is it getting less? Are fewer people getting ill, or more? Why? Draw maps to show where people are getting sick because of malaria. At school, find out from other children in the group:

- how many children or others in their family have
- had malaria in the last year.
- how often did they have it?
- in which months did they fall ill?

Use this information to keep records, or make simple graphs to show:

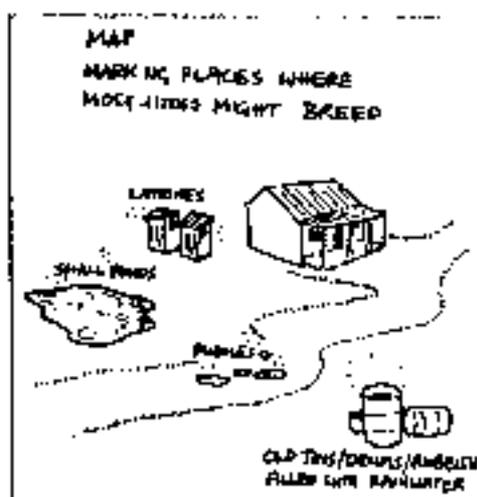
- the months of the year in which people get malaria (mostly in the rainy season).
- the months in the year when it rained and there were many puddles.
- the ages of those with malaria.
- who went for treatment.

Children can plan and keep such records throughout the school year.

Discuss how such information could be useful to children, their families and the health workers.

Where do mosquitoes breed?

In the rainy season, make a map of the area of the school, and mark on it all the places where mosquitoes might breed. Then check all those places, to see if there are larvae in them. Can you get rid of the water in which the mosquitoes are breeding? How?



What do people know about malaria?

Using the information in this activity sheet, write down the important facts about malaria. With the help of their teachers, children can then make up a simple questionnaire to find out what families believe about malaria, and what they do about it. What can children do once they have collected this information?

Observing the mosquitoes

In the environment Find out where mosquitoes are most plentiful. Which kind of mosquitoes are they? Where are larvae found? What kind of larvae are they?

In the classroom Collect larvae. Put them in a covered jar or other container with water, grass and some mud in it. Observe them. You should put a little bread or flour on the water for them to feed on.

Children can draw and write about what they see.

Preventing malaria

Children can help prevent malaria in many different ways:

- Make sure that nets are properly used. It is most important to cover sleeping places of very young children. Older children can make sure that younger ones stay under the nets until first light, and that nets are well tucked in.
- Where chemicals such as permethrin are available and mosquito nets are used, children can encourage families to dip their nets to provide better protection. Schools could organise "net-dipping days" every six months.
- Check for holes and tears in nets regularly and sew them up.
- Kill mosquitoes in the house.
- When the spray teams come, help carry food and other things out of the house.
- Destroy breeding places. Fill puddles with earth and stones. Put oil on shallow ponds (old engine oil from cars and lorries works well).
- Make and fit covers for water pots and containers. This helps to prevent other mosquitoes from breeding there.

Teachers, children, parents and health workers need to work together to prevent malaria. Find out what others are doing.

Helping children who are sick

When young children get malaria they need help quickly, or they may die. Older children can watch for the signs of malaria and tell adults when the young ones need treatment.

Children with malaria feel very ill. Older children can help to comfort them, keep them cool, and give them drinks (see Activity Sheet 6.2, **Caring for Children Who Are Sick**).

It is very important that children take the right course of medicine at the right time. (Children's doses vary according to the age and size of the child.) After the first dose they may feel better, but all the germs are not yet killed. Older children must help others to understand how important it is to finish the medicine.

Passing the message

Children can help spread the important message about preventing and treating malaria to parents and other adults, as well as to other children. They can do this in many ways.

Make up a play or dance The children can mime the Plasmodium germs and the medicine. The medicine (like policemen) comes in several times. The first time the medicine catches most of the malaria germs but some germs hide. It takes three more times before the germs are caught.

Children can act, mime or dance:

FOLLOW-UP

Children can test themselves and others on the facts about malaria.

They can keep records and help the school to do so. Look at the charts after some months. Have cases of malaria increased or fallen? Are some months worse than others? Why? Are more people using nets and protecting their neighbourhood? What have the children done to help at home? at school? in the neighbourhood? Let them describe their experiences.

Children can and must continue to be aware of the dangers from mosquitoes, and continue to take action such as filling puddles. This is especially important after the rains.

USING THIS SHEET

This sheet can be used by **health workers and youth group leaders**. There are also many ways it can be **used in schools**. It can help teachers to plan activities in nearly every subject in school. For example:

- in maths, make graphs of malaria spread.
- in social studies, make maps and do surveys (where is malaria found? where do mosquitoes breed?).
- in science, observe the life cycle of the mosquito.
- in language, write stories and plays about malaria.
- in cultural subjects, make up songs and dances, draw pictures.

REMEMBER: MALARIA IS A KILLER DISEASE

MOSQUITOES ARE QUICK AND CLEVER

DON'T GET BITTEN

AVOID MALARIA

- the life cycle of a mosquito.
- careless and careful families and villages (some
- an act the part of clever mosquitoes).
- germs and medicine.
- *Make posters* Posters by the children can show:
 - how malaria is spread.
 - how it can be controlled (particularly in 'danger periods' like after it rains).
 - that pregnant women need to visit the health clinic.
 - why children need to take the full dose of medicine.
- Be sure to put the posters where they can be seen by many people.
- *Write stories* Children can write and illustrate stories and share them with others. Some titles might be:
 - Mrs Mosquito and her Friends
 - The Day the Spray Team Came to Our Village
 - Careless Moses (who didn't take the full course of medicine).

Sing songs Children can make up 'Prevent Malaria' songs and teach them to families, friends and to other children.

Malaria Advice for Overseas Travellers (from staff health guidelines)

Always obtain the appropriate type and quantity of anti-malarial drugs before you travel

Remember that prophylactic drugs must be started before you arrive in the malarious area. Usually at least one week to ten days before.

Introduction

Malaria is the most important and widespread tropical disease in the world. It causes much chronic ill health in endemic areas, as well as an estimated two million deaths every year. In recent years, malaria risk has become worse because:

- Infective mosquitoes have spread or returned to areas which had been free or only lightly affected
- Falciparum ('malignant') malaria has spread to areas where 'benign' (vivax, ovale, malariae) malaria was the only or prevalent form
- Malaria parasites, esp. falciparum, have developed drug resistance
- Malaria is present in most countries where Oxfam works.
- Malaria is the most important preventable cause of illness in Oxfam staff. It can be insidious in onset and lead very rapidly to unconsciousness and death. Types of drugs used to prevent malaria attacks vary with the area you are going to and between individuals. They are not interchangeable.

Causes and spread of malaria

Malaria is caused by a single-celled parasite called **Plasmodium** which spends part of its complicated life cycle in mosquitoes. It is spread through the bite of infected mosquitoes. Humans are affected by four different species of parasite:

Plasmodium falciparum; Plasmodium vivax; Plasmodium ovale; Plasmodium malariae

P. falciparum is the most dangerous. It causes 'malignant' malaria which can quickly progress to unconsciousness and death. When it affects the brain it is sometimes called 'cerebral' malaria. At present, it is most common in sub-Saharan Africa, South East Asia and the Amazon basin of Latin America.

Symptoms of malaria

The classic symptoms are:

- | | |
|--|---|
| <ul style="list-style-type: none"> • fever • rigor (shivering) | <p>Also</p> <ul style="list-style-type: none"> • vomiting • diarrhoea |
|--|---|

- sweating
- abdominal pain
- headaches
- jaundice

The first attack occurs from seven days and up to one year after being infected. The attacks are usually intermittent. This periodicity depends on the type of Plasmodium and is usually 2-3 days. *P. falciparum* infection can cause continuous fever without any periodicity. Drowsiness and confusion may be the first signs of 'cerebral' malaria. **Note that:**

Malaria can sometimes occur without fever; not all feverish attacks are due to malaria

Diagnosis of malaria

The only definite way of diagnosing malaria is to discover the parasite in the red blood cells. A drop of blood has to be stained and examined under a microscope. They can be difficult to detect, especially if the number of parasites in the blood cells is low. A proper laboratory diagnosis should be obtained whenever possible. If not, the disease may have to be treated on the symptoms alone.

Prevention of malaria

Because of the changing geography of spread and increasing drug resistance of the malaria parasite, our advice on preventing attacks is under constant review.

Successful personal prevention of malaria must be two-fold:

- **avoid being bitten**
- **take prophylactic anti-malarial drugs**

1 Avoid being bitten

Most mosquitoes start biting at dusk:

- Shower (mosquitoes are attracted by sweat)
- Cover up - long sleeves, trousers, socks
- Use insect repellent on exposed areas of skin

Various other measures are available: mosquito coils (which burn, producing insect-repellent fumes), impregnated head, wrist and ankle bands

At night:

- **mosquito nets** are the most important physical measure against malaria. Always use one. Bednets treated with insecticide such as permethrin are more effective. Oxfam offices provide these for personal use of staff on deployment to project areas. Permethrin treatment has to be applied every six months, to re-impregnate the nets.
- Fit windows and doors with fine wire mesh.
- Sprays can be applied inside the house

These measures are important for other mosquito-borne diseases, e.g. dengue fever, yellow fever, Rift Valley fever

2 Prophylactic anti-malarial drugs

If you were born in and live in an endemic malarial area you will have some natural immunity to malaria; however if you move to a different area or have been out of the endemic area for 2 or more years, you may have lost that immunity.

Strictly speaking, taking prophylactic drugs does not prevent malaria, it only suppresses the symptoms of disease. This is why it is important to take them before arriving in the malaria-endemic area and continue after departure from it.

No drug or drug combination gives total protection; whatever you take, it is important to be aware that it is still possible to become ill with malaria. However, most malaria attacks will be prevented if the appropriate drugs are taken regularly for the prescribed period.

Currently, the following drugs are used:

- Chloroquine ('Nivaquine', 'Avlochlor') alone, eg Central America
- Chloroquine and proguanil (Paludrine), eg India
- Chloroquine and Maloprim e.g. some Pacific islands
- Mefloquine ('Lariam') eg sub-Saharan Africa, parts of Asia
- Doxycycline, eg parts of Asia and Sub-saharan Africa, parts of Asia
- Malarone (atovoquone and proguanil). This is the newest anti malarial now available. It is VERY expensive! It is most useful as a stand by treatment drug., or for use by individuals for whom no other antimalarial is possible.

Always follow the advice on the drug packet for any possible side effects of these drugs. Which of these drugs or combinations of drugs you are given depends on

- a. the area you are going to
- b. whether you have had past adverse reactions to one of the drugs
- c. any factors which might result in problems if you take the drugs - eg. pregnancy, past health problems, health problems running in the family

Advice to pregnant women and women who might become pregnant

- a. Malaria in a pregnant woman increases the risk of maternal death, miscarriage, stillbirth and death.
- b. Some prophylactic and treatment drugs may be unsafe in pregnancy.
- c. Be extra diligent in the use of measures to protect against mosquito bites.
- d. Take chloroquine and proguanil prophylaxis. Other drugs are either dangerous or insufficiently investigated to be taken safely in pregnancy.
- e. Take folic acid 5mg daily, when taking proguanil.
- f. Do not take mefloquine or doxycycline prophylaxis.

g. Seek medical help immediately if malaria is suspected, and take emergency stand-by treatment (quinine is the drug of choice) **only** if no medical help is immediately available. Medical help **must** be sought as soon as possible after stand-by treatment.

Advice to parents of young children

- a. Children are at special risk
- b. Protect children against mosquito bites. Mosquito nets for cots and small beds are available. Keep babies under mosquito nets between dusk and dawn.
- c. Give prophylaxis to breast-fed as well as to bottle-fed babies. Breast milk does not give protection.
- d. Seek medical help immediately if a child develops a febrile illness. The symptoms of malaria in children may not be typical and so malaria should **always** be suspected. In babies less than 3 months old, malaria should be suspected even in non-febrile illness.

DRUGS WHICH ARE NOT RECOMMENDED BY STAFF HEALTH

HALOFANTRINE (halfan)

Can cause *severe* cardiac disturbances, sometimes leading to death. It has therefore been withdrawn from use in the UK. And many other countries.

Avoid halfan if on mefloquine either as prophylaxis or treatment.

FANSIMEF

Combination of Fansidar and mefloquine.

Not licensed in the UK

AMODIAQUINE (camoquin)

Reported bone marrow depression therefore it is no longer in use.

PYRIMETHAMINE (daraprim)

Widespread resistance has made daraprim ineffective.

DRUGS RECOMMENDED BY OXFAM FOR EMERGENCY STANDBY TREATMENTS

Quinine 300mgs (x42) and Fansidar (x3)

Take 2 tabs of quinine three times a day for 7 days followed by 3 tabs of Fansidar once.

- Quinine may cause tinnitus (ringing in the ears) headache / dizziness / and nausea.
- Fansidar should not be taken if you have a sensitivity to sulpha based drugs, neither should it be taken as a prophylaxis.
- Not safe in pregnancy and while breast feeding.

Mefloquine 250mgs (x4) (Larium)

Take 2 tabs. immediately and 2 tabs. six hours later.

- There is a risk of neuropsychiatry side effects e.g. vivid dreams / dizziness / and rarely, hallucinations with a therapeutic dose, but the hazards of untreated malaria are greater.
- Not safe as a treatment if mefloquine is being taken as a prophylaxis.
- Not safe in children less than 2 years old.

Atovaquone 250mgs and Proguanil 100mgs

(Malarone)

Adult; Take 4 tabs as a single dose on each of three consecutive days. (x12 tabs)

Not suitable as a treatment for children under 11kgs.

- Suitable in chloroquine resistant areas.
- Not safe in pregnancy or breast feeding.
- Do not take concurrently with rifampicin or riabutin.

Co-artemether and benflumetol

(Riamet x

24)

Take 6 doses of 4 tabs over a period of 60 hours. i.e. 10 hours apart

Derived from the Chinese herbal drug quinghaosu. The main ones are artemether, artesunate and arteether.

Contains artemether and lumefantrine (benflumetol)

Can be used in children over 5kgs.

If used alone, malaria can recur.

Not recommended in pregnancy or breast feeding.

Not yet licensed in the UK but available and used widely in some parts of the world.

Artemisinin (Artemether / Artenam)

Is a synthetic derivative of Artemisinin which is a new anti malarial drug of Chinese / Vietnamese origin. Artemisinin is extracted from quinghaosu which has been used for centuries in Chinese medicine.

(Not available in the UK but readily available in many countries usually as a combination drug – see above.)

Example Malaria Budget

Part III

Resources

Example Malaria
Budget