DFID Department for International Development

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Malaria: Country Profiles

Version 1.1

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Burma

Summary table: malaria in Burma

Parasites	*P. falciparum, P. vivax*
Vectors	*A. dirus, A. minimus, A. epiroticus*
% of people under ITNs and variation across the country	Estimated 8 million nets in Burma, but most are not ITNs. Only 5.65% of medium and high-risk population protected by ITNs (2008).
First-line drug for *P. falciparum* (unconfirmed)	CQ
First-line drug for *P. falciparum* (confirmed)	DHA-PPQ, AL, AS+MQ
Second-line drug for *P. falciparum*	DHA-PPQ, AS+AM, AL
Treatment of *P. vivax*	CQ+PQ(14d)
Evidence of insecticide &/or drug resistance	Artemisinin-resistant *P. falciparum* has been identified on the Thai-Cambodian border. Extent of resistance largely unknown.
IRS use	Selectively targeted in order to contain outbreaks, especially in endemic areas such as development project sites and temporary settlements.
IPTi use	Not in use in Asia due to high SP resistance.
IPTp use	Not in use in Asia due to high SP resistance.
Evidence of diagnostics being used to direct antimalarial treatment	Most cases are not confirmed by diagnosis, in part due to RDT stock-outs and poor quality and coverage of microscopy.
	July 2011

1. Introduction

Burma has the highest rate of malaria-related mortality in south-east Asia, and the disease is the leading cause of morbidity and mortality within the country.[641,642] The tumultuous internal politics of Burma have resulted in an under-funded health system, an unregulated private drugs industry and difficult relationships with donors and NGOs that have drastically hindered malaria control interventions.

2. The Burden of Disease

284 of the 325 townships in Burma are malaria endemic, which amounts to an estimated 68% of Burma's population being at a risk of contracting the disease.[643] The most vulnerable segment of society is non-immune migrant workers who work in the gem-mining, logging, agriculture and construction industries.[644] Children under the age of five account for 13% of cases, and pregnant women, account for just 0.91%. Soldiers are also at risk.[645] Between 2000 and 2008 the number of reported malaria deaths decreased from 2,756 to 1,088, and hospital admissions over the same period fell from 187,289 to 47,553. The number of reported malaria cases, however, has more than doubled during this time, from 245,000 to 566,000.[646] This trend is most likely due to the improved access to malaria treatment services, resulting in higher reported cases and lower mortality rates.

75% of recorded malaria cases are caused by the *Plasmodium falciparum* parasite, with *P. vivax* accounting for the other 25%. The vectors found in Burma are *A. dirus*, *A. minimus*,

and *A. epiroticus*.[647] Artemisinin-resistant *P. falciparum* was reported on the Thai-Cambodian border in 2006-2007, and since then evidence from recent drug efficacy monitoring suggests that it may occur in north-eastern Burma.[648] There is concern that Burma's substandard drug problems and under-funded health sector will contribute to the regional drug resistance problem. Cross-border economic migration would facilitate the transmission of these resistant strains to neighbouring countries.[649]

The changing behaviour of mosquitoes may influence the effectiveness of vector control measures. *A. dirus* has adapted to certain village environments by breeding in village domestic wells, in addition to its usual breeding sites. Furthermore, *A. minimus* bite humans outdoors and early in the evening, diminishing the impact of insecticide treated nets (ITNs). However, evidence suggests that indoor biting remains more frequent, and therefore Indoor Residual Spraying (IRS) and ITNs should continue to be effective in preventing malaria.[650,651]

Vector[5]	Breeding places	Biting habits	Resting habits
A. dirus	Small water collections, footprints of animals, wheel-tracks, burrow-pits, usually in thick forest or forest fringe with heavy shade and high humidity	Exophagic (bites outdoors), highly anthropophilic (prefers to bite humans)	Exophilic (rests outdoors after feeding)
A. minimus	Edges of flowing waters such as foothill streams, and springs. Prefer shaded areas of sunlit habitats.	Both exophagic and endophagic (bites indoors), and anthropophilic, but frequently show zoophily) found to bite cattle more frequently than *A.dirus*	Mainly exophilic (rests outdoors after feeding).
A. epiroticus	Salt and brackish waters, lagoons, marshes, pools and seepages.	Exophagic as well as endophagic. More anthropophilic than zoophilic.	Exophilic and endophilic

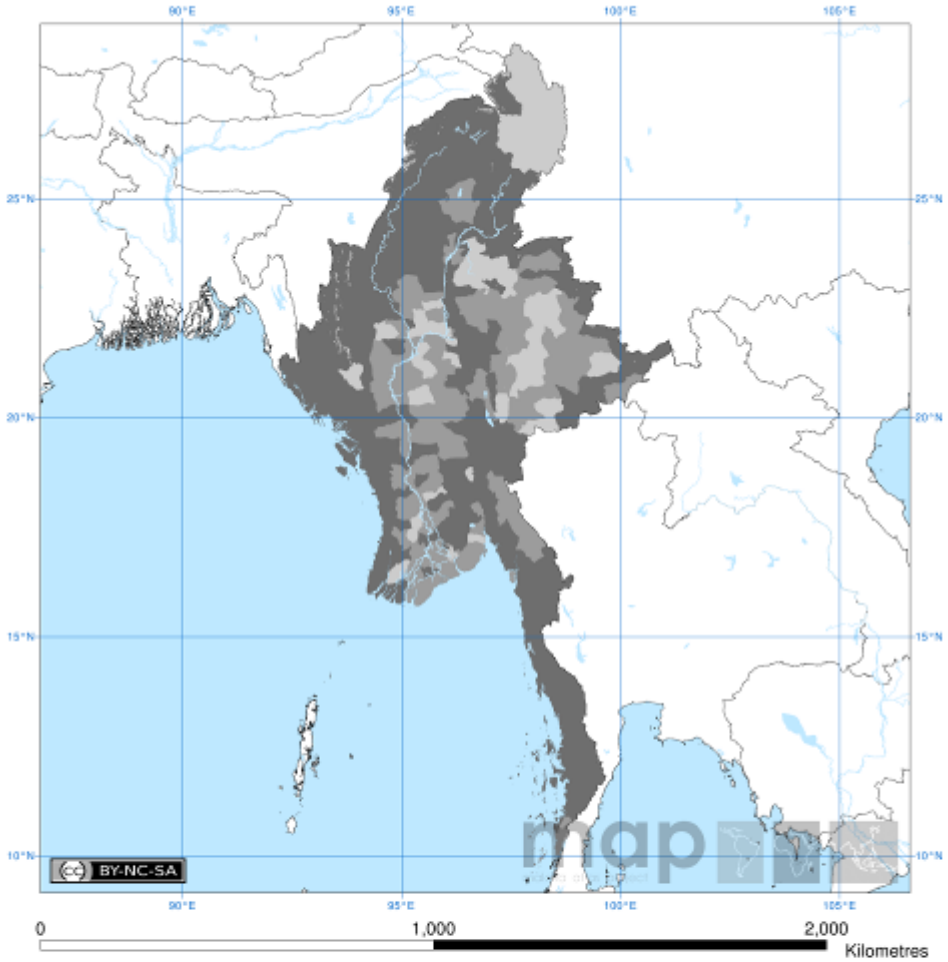
The transmission of malaria in Burma is perennial, with peaks in the rainy season.[652] The areas with highest transmission are the hilly and forested border areas, which are often inaccessible due to the terrain, poor infrastructure and ongoing conflict. The people who live in these areas are impoverished and rural ethnic minorities, whose land has been ravaged by decades of conflict.[653] The risk of malaria is related to:

- Short and long-term population mobility for work and economic pursuits- dam construction, mining, logging, forestry, road construction and maintenance
- populations living permanently in or near forest

The risk by age and sex varies in different regions with more adult males in areas of occupational migration to forests or forest fringes. Different strategies are needed for these two main groups.[654]

[5] Most of these are species complexes, and the behaviour of individual sibling species (morphologically identical separate species) shows some differences

Plasmodium vivax risk including biological masks in Myanmar



Biological masks: Biological masks were used to modify malaria risk defined by the medical intelligence layers. If temperature did not exceed the limit for successful sporogony of *P. vivax* in the local dominant *Anopheles* vector species, risk was downgraded to malaria free (Gething *et al.* (2011). in prep). If the area was hyper-arid (as defined by the bare area definition of the GLOBCOVER product (http://ionia1.esrin.esa.int/)) risk was downgraded from stable to unstable or from unstable to malaria free.

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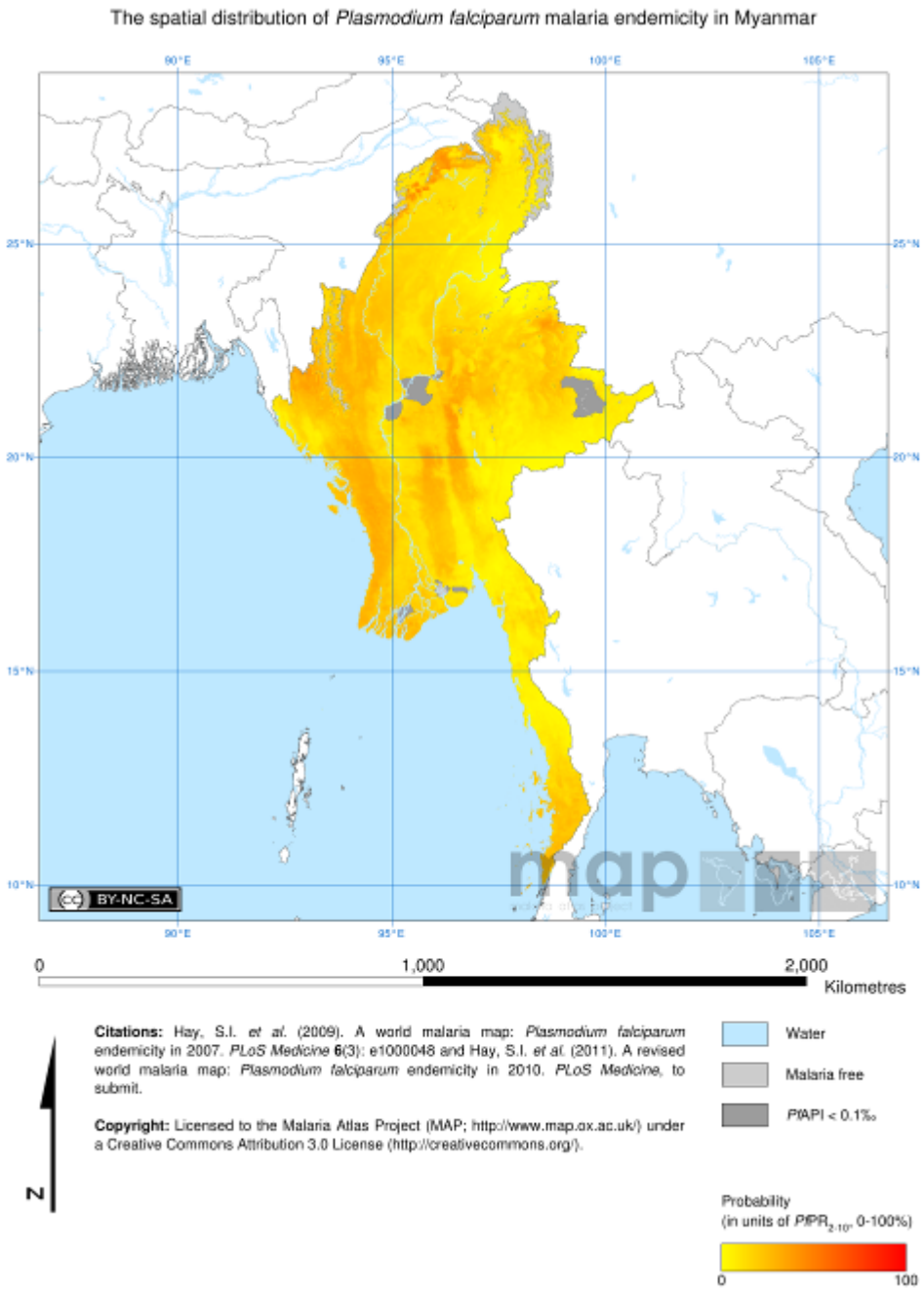
N

Water

Malaria free

*Pv*API < 0.1‰

*Pv*API ≥ 0.1‰



3. Malaria Control Programme

3.1 Policies, Strategies and Plans

Burma has a National Strategic Plan for Malaria Control for 2006-2010, which has recently been updated for 2011-2015.[655] The main points of this are:

- Scaling up the coverage and consistent use of long lasting insecticidal nets/insecticide-treated mosquito nets (LLINs/ITNs) and selective application of indoor residual spraying (IRS) and other preventive measures where appropriate
- Improving early access to quality assured diagnosis and effective treatment.
- Empowering communities at risk and strengthening multi-sector partnerships.
- Strengthening program management and technical support.

3.2 Prevention

Evidence of efficacy of ITNs and treated hammock nets in Southeast Asia is limited, but several published studies have shown at least some effect.[656,657,658] An estimated 8 million nets are in use in the country, but only 531,400 are teated with insecticide. As a result, only 5.65% of the population in medium and high-risk areas are protected by ITNs/LLINs.[659] ITN distribution and net treatment therefore currently form the primary aspects of preventive control in Burma, with the Vector Borne Disease Control (VBDC) unit hoping to achieve 100% coverage by 2014.[660] About 694,000 ITNs were distributed in 2008, 113,000 of which were LLINs; double the number distributed in 2007.[661] In addition IRS is used selectively in order to contain outbreaks, especially in development project sites and temporary settlement areas that are endemic.[662] 11,284 people were protected by IRS in 2008.[663] Intermittent Preventive Treatment (IPT) is not used in Asia due to very high levels of resistance to sulfadoxine-pyrimethamine (SP). The WHO only recommends IPT in Africa.[664]

3.3 Case Management

Increasing early diagnosis and treatment (EDAT) is an essential part of Burma's National Strategic Plan for Malaria Control. Malaria cases examined by microscopy increased from 120,029 in 2000 to 411,494 in 2008, associated with a 20% increase in the number of slides examined and an increase in the slide positivity rate, from 31% to 45%.[665] However, large improvements have been limited by lack of financial resources and therefore most reported cases of malaria continue to be unconfirmed.[666] The quantity of RDTs and microscopy supplies is inadequate, and of the 700 malaria microscopy centres only 60% are functional. Even then, the quality of the diagnosis is a concern.[667]

The national protocol for antimalarial drugs is to use artemisinin-based combination therapy (ACT) for *P. falciparum* (artemether-lumefantrine currently recommended) and chloroquine and primaquine for *P. vivax*. However, in 2009 only 25% of patients were treated according to National Treatment Guidelines, which the government hopes to increase to 60% by 2015.[668] Indiscriminate use of anti-malarials is rampant. Coverage with ACTs of an assured quality remains low in both the public and private sector, and monotherapy with artemisinin-based drugs of dubious quality is common. This may contribute to spread of drug resistant malarial parasites.[669]

3.4 Supporting Interventions

In support of the preventive and case management interventions discussed above, the VBDC is attempting to empower Burma's 40,000 community health workers to encourage ITN use and to carry out EDAT in isolated rural areas. However, many health care workers are yet to be trained or require retraining to deal with the changes in malaria control.[670] Behaviour change communication (BCC) is in use, but it is not adapted to fit the language and culture of at-risk ethnic minorities and migratory groups.[671] There are numerous NGOs operating in Burma, but their actions are not coordinated and they often do not share data with the Ministry of Health and VBDC. This makes planning, estimating the extent of the disease burden, monitoring programmes and evaluating the impact of interventions difficult.[672] Monitoring and evaluation at the township level is hindered by the weak managerial and technical capacities of the health system.[673] Burma has a history of carrying out high quality research into malaria, but the interested institutions lack resources.[674]

3.5 Delivery Systems

Malaria control is integrated into the general health services and is part of the National Health Plan. At national level, malaria control is part of the VBDC Programme, which is

responsible for technical guidance, planning and monitoring and evaluation. At the township level malaria control is integrated into the primary care health system (WHO 2005). While health care is technically universal and free, the lack of financial resources and trained staff, the poor state of infrastructure and equipment, the patchiness and inaccessibility of provision, and the regular lack of supplies mean that only 25-40% of people seek treatment in the public sector.[675]

Therefore people turn to the private sector for anti-malarial drugs, which are often of substandard quality and often taken without confirming diagnosis of malaria (the actual drivers of spread of resistance are difficult to confirm). This could lead to increased risk of spread of drug resistant parasites. The Food and Drug Administration (FDA) is weak and understaffed, hindering its ability to check the sale of false and substandard drugs in the private sector.[676]

4. Health System Issues

The biggest problem facing the health system in Burma is a lack of financial resources; government expenditure on healthcare was just $0.4 per capita in 2005-06.[677] The VBDC has 2,392 posts nationwide, but only 1,600 are filled because they cannot afford the training or the pay. Financial constraints hinder much-needed training and capacity building, leading to poor management at the township level; affecting supply, planning, implementation, monitoring and evaluation.[678] The lack of financial resources also limits the expansion of diagnostic and treatment services. The burden of health care therefore predominantly falls upon individuals, who are the source of 73.4% of national health expenditure, which hits the poorest and most vulnerable the hardest.[679] The availability and quality of care differs hugely across Burma, with the worst provision in the peripheral forested areas where malaria is most endemic, and where ongoing internal conflict hinders public health provision.[680] Burma's health information systems are very weak, with data collected at the local level being inconsistently consolidated. In particular data from partners are not incorporated into Burma's information systems.[681]

5. Current Funding and Technical Support

The 3Diseases Fund (3DF) was established by Australia, the Netherlands, European Commission (EC), Norway, Sweden and the United Kingdom in order to fill the gap left by the withdrawal of Global Fund support in 2005. A $100 million grant was provided to tackle HIV, TB and malaria for 2006-2011, and activities included programme planning and implementation and capacity strengthening of township health department and logistics.[682,683]

The Global Fund to fight Aids, Tuberculosis and Malaria (GFATM), satisfied by new government assurances, approved a $77,384,020 grant in Round 9 of its funding cycle for 2011-2015. The funded project builds on the progress made and lessons learnt with the 3DF, and follows Burma's National Strategic Plan for Malaria Control in scaling up ITN distribution, improving EDAT, empowering health care workers and building the management capacity of the national health system. The project will cover 14 of the country's 17 states, reaching 40.9 million people.[684]

The Global Alliance for Vaccines and Immunizations (GAVI) is providing a $33 million grant for health systems strengthening in order to improve services in 180 villages. The project aims to develop annual township health plans and budgets, and introduce innovative health financing schemes in order to strengthen township level health systems.[685]

WHO is a major source of technical support including monitoring of drug efficacy.

UNICEF is financing supply chain management officers at state and division level in order to improve the logistics of supply provision.

USAID's Mekong Malaria Project is strengthening the regional capacity of the FDA and revising the quality assurance system for microscopy.

6. Major Gaps

The possibility of artemisinin resistance developing in *P.falciparum* is a potentially catastrophic development that would seriously hinder global malaria control. It is crucial that evidence of artemsinin-resistant strains of malaria is collected, and if confirmed, acted upon to limit its spread. Research is therefore extremely important, but so is tackling likely causes of increasing resistance, such as the prevalence of unregulated treatment provision and poor quality drugs

Limited information on the current epidemiological patterns of malaria hampers planning and prioritisation of malaria control interventions, and access to populations at highest risk to provide adequate prevention, diagnosis and treatment needs to be improved.

Lack of financial resources has led to inadequate supplies and limited capacity, especially at township level, to plan and manage malaria control.

As neighbouring countries progress towards malaria elimination, a less extensive capacity to control malaria in Burma is likely to hinder their efforts, particularly with the levels of migration in the region.