Regional Malaria Financing Task Force (RMFTF)

Priorities in Financing the Control of Malaria in the Asia-Pacific
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Executive summary: More money for malaria control and more malaria control for the money.

Malaria remains a common infection in Asia-Pacific and is responsible for substantial mortality and disability. The disease incurs significant productivity losses and economic costs. Despite notable success in reducing malaria over the last decade from increased investments in malaria control, significant challenges remain.

This document examines how to improve the financing of malaria control in the region so as to align with the public health goals of decreasing malaria burdens. The most pressing need is financing efforts to decrease or delay resistance against artemisinin drugs and against insecticides, two of the central tools of malaria control.

The report focuses on three key pillars and provides the following recommendations for the Regional Malaria Financing Task Force (of the Asia Pacific Leaders Malaria Alliance):

I. The need to fight resistance against artemisinin and insecticides

Without accelerated action, these vital tools for fighting malaria will become less effective., The emergence of resistant malaria in additional sites, its spread from countries where it has already emerged, or both, jeopardizes malaria control in all parts of the world, possibly presaging increasing death rates. This was the sequences with chloroquine resistance.

Greater penalties for counterfeit anti-malarial drugs and more resources toward testing for drug quality are required along with operations research and elimination programs for areas already in the pre-elimination phase. Earlier estimates suggest that the cost of containing artemisinin resistance is estimated to be US$180 million for the region as a whole – or about 4% of the estimated US$4.78 billion required as total investment between 2012 and 2015. Notwithstanding uncertainties in measuring costs of future interventions, fighting resistance constitutes about 0.5% of the total estimated cost (around US$32 billion) to eliminate malaria in 19 countries by 2030.

**We recommend doubling anti-resistance efforts to about $400 million** for the following reasons: (1) Align the investment with the proportion typically used in private R&D for new drugs (typically about 5-10%); (2) Expand efforts to combat insecticide resistance; (3) Urgently implement and evaluate elimination strategies (including, if needed, more experimental approaches strategies) where resistance already exists; and (4) strengthen enforcement of laws against counterfeit drugs. The extra spending should be viewed as insurance for other malaria control efforts and resurgence in the region or in Africa.

Fighting resistance is of global relevance, and constitutes a global public good, and hence its finance needs to draw in countries and agencies not in the region that would benefit from preserving effective tools for malaria control.

II. The need to engage the private sector

The vast proportions of patient contacts occur in the private sector, mostly as out of pocket payments to treat fever or other symptoms of malaria. Effective malaria control in the region need not await the steady expansion of universal health insurance in the region, which would enable much better
regulation of private practice. Moreover, there is a need to try to align the private sector with the public health goal of expanding pre-treatment parasitological confirmation of malaria, mostly through rapid diagnostic tests for malaria (which may lead to reduced spread of drug resistance in certain circumstances, safer use of drugs, and avoids unnecessary treatments). This public health goal has to be balanced against the reality that many patients with fever and healthcare providers will ignore a negative RDT result and take anti-malarial anyway, either in the public or private sector because an alternative course of action is not obvious.

A financing scheme that has been effective is the Affordable Medicines Facility - malaria (AMFm) which was used to expand the supply of and demand for artemisinin-based combination therapies (ACTs) and comprises three main activities: (i) negotiated global price reductions with private pharmaceutical companies to sell ACTs to private importers at the same prices usually sold to public importers; (ii) a high level subsidy designed as a “factory-gate” subsidy paid to the manufacturer so as to lower prices in line with drugs with which ACTs would compete with the less effective chloroquine and SP combination or also artemisinin monotherapies); and (iii) county-specific supporting interventions for regulation and quality assurance.

The AMFm approach has been shown to be highly cost-effective, and is highly relevant to Asia-Pacific given the large private practice, and the presence of a vibrant generic drug industry. As about 60% of the malaria contacts in the public sector have a microbiological diagnosis, this suggests subsidies for RDTs might also play an important role. Moreover, by decreasing use of monotherapies and fighting counterfeit drugs the AMFm also offers a powerful economic tool to fight the spread of ACT resistance.

We recommend establishing an “Asian Affordable Medicine Facility for malaria“ or AAMFm that would build upon the lessons learned from AMFm, including support for both ACT and RDTs. The crude initial estimate of the costs for such a fund are about $100 million to cover the region.

III. Sustainable and higher impact financing for malaria control.

Current public sector malaria expenditure in the Asia-Pacific region is around $280 million per year, mostly through governments with sizable contributions from the Global Fund to Fight AIDS, Tuberculosis and Malaria, the US President’s Malaria Initiative, the Bill & Melinda Gates Foundation and the governments of Japan, Australia and the United Kingdom. From 2006-2010 external funding represented about half of public sector financing. In addition to public expenditure a large, undocumented amount of financing is derived from private consumption of malaria medicines.

The total resources required for a comprehensive response have been estimated to cost more than $1.6 billion in 2014 alone. Donor financing for malaria control in the Asia-Pacific region is likely to decrease, which will require an increasing share to be met domestically and by innovative external financing instruments.

There are several complementary ways for countries to fill the gap between needs and resources. The first is to raise additional revenues for the program. Previous analyses have suggested that if Asian countries were to allocate 2 per cent of their health budgets to malaria the funding gap would be reduced to around US$685 million from 2013-15 (US$260 million excluding India and China). Focused, high-level advocacy to impress upon the key decision makers the success of malaria control, the threat of resistance undermining these, and the economic benefits of control are needed. Pilot efforts on novel financing mechanisms, like malaria bonds (now being tested in Mozambique) should be encouraged.
However, we caution that it is not sufficient to simply ask Ministries of Finance for more money for malaria control without commensurate efforts to show more malaria control for the money spent.

More malaria control for money spent would involve two related approaches. First, would be to strengthen national malaria control programs by expanding their capacity to manage more complex efforts, such as results-based financing (RBF). This would include focusing the needs of the malaria program on the most effective interventions, including the global benefits of fighting drug and insecticide resistance. It would also require substantial expansion of surveillance, notably to have better estimates of malaria deaths among adults in the region. These data would also serve to document successes and challenges, including the prospects of elimination in some countries. Robust evidence remains the best advocacy and the expansion of surveillance and other tools of accountability would make it easier to build on success in malaria control.

Second, there is a need to move donor funding for malaria control away from an input model that focuses on the procurement and distribution of key inputs (most notably mosquito nets) toward more support for operational improvements, capacity building in program management and surveillance and knowledge generation and sharing. The best mechanism to do so is to move countries toward RBF or similar approaches, which have the benefit of aligning incentives for countries to use evidence-based, epidemiologically-sound control practices with the resources available. Within large countries, such as India, national malaria programs should also consider RBF-based approaches to enable local control. For example, the Global Fund is supporting a $10M fund for Elimination of Malaria in Mesoamerica and Hispaniola using a cash-on-delivery model for 10 countries in the region.

We recommend establishment of a Regional Asia Malaria or Infectious Disease Fund perhaps to be housed at the ADB, in close partnership with the GFATM (ensuring explicitly that the Asia Fund does not duplicate the work of the GFATM) to enable a transition from an input-based model of malaria control in the region to one driven by strong national programs that use evidence to guide decisions. The chief focus would be on regional efforts, including fighting resistance, cross-country links on pharmaceutical policy and access, and linkages of malaria control to other regional efforts, such as pandemic influenza response. The estimated start-up size of the Asia Fund is about $100 million.
1. Heterogeneous epidemics and common challenges

More than 60% of the populations in the 22 malaria endemic countries of the Asia-Pacific region are at risk of being infected with malaria. It is estimated that between 28-36 million malaria cases occur each year, although the numbers have been decreasing (cases in India remain the main known unknown, with some estimates ranging up to 80 million cases, and 200,000 annual deaths).

The region is characterised by multi-drug resistant parasites; abundance of ‘vivax’ malaria; high reliance on out-of-pocket health care spending; counterfeit or poor quality antimalarial drugs; and remote, at-risk populations. The magnitude and timing of the resources required for expanding coverage of key interventions within these constraints are not clearly defined due to phasing across periods of scale up, sustained control and elimination which vary according to malaria prevalence in each country. Resource needs require definition for each of these phases using epidemiological modelling.

Since 2000, the rates of reported malaria cases and deaths have decreased significantly across the region as a whole. Over one quarter of countries in the region have achieved more than a 75 per cent reduction in malaria cases, while one-fifth have achieved a reduction of between 50 and 75 per cent. Diverse challenges from countries with large contribution to global mortality and cases from malaria, such as India, Bangladesh and Pakistan, large countries with low contribution to global deaths but focal challenges, such as Vietnam, and countries considering elimination (including Bhutan, China, North and South Korea, Indonesia, Malaysia, Philippines, the Solomon Islands, Sri Lanka and Vanautu). Elimination (2010-2015) proposes to reduce malaria deaths and illness by 50 per cent by 2015 compared with 2007, and to achieve the interruption of malaria transmission in targeted areas in at least seven countries. It involves a ‘Three Part Strategy’ including a plan to: reduce the burden of malaria through aggressive control in the malaria heartland; progressively eliminate malaria from the endemic margins; and conduct research to bring forward new malaria control tools.

![Figure 1: Countries Practicing Malaria control and Elimination in Asia](image)
Some researchers indicate the gains achieved against malaria in the past decade have no parallel since the Global Malaria Eradication Programme (GMEP), which ended in 1969. Increased funding since 2000 has allowed scale-up of effective interventions, and malaria has declined considerably in many previously highly endemic parts of the world. While these successes confirm that well-funded antimalarial interventions can have enormous impact, the global increase in malaria burden that occurred in the aftermath of the GMEP underscores the potential fragility of such gains. A systematic review of the causes categorised resurgence as the weakening of malaria control programmes (68/75 = 91%), increases in the intrinsic potential for malaria transmission (44/75 = 59%), and technical problems including drug and insecticide resistance (24/75 = 32%). Most programmatic weakening was attributed to funding shortages (37/68 = 54%).

A number of challenges are preventing a more significant reduction in the burden of malaria disease and potentially increasing the likelihood of the spread of artemisinin resistance. These include: the presence of substandard or fake malaria drugs in a strong, heavily utilised private sector; high levels of labour mobility; low access to treatment or malaria commodities because of high prices; changing

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infrastructure and environmental conditions leading to new transmission pathways and; difficulty in delivering interventions to hard-to-reach populations.

Thus, the common elements for all Asian countries are as follows: (1) the need to protect current tools of control, most notably resistance to artemisinin based Therapies (ACT); (2) engaging with the private sector, where most people continue to purchase malaria treatments; and (3) achieving sustainable finance in the region at the domestic and developmental assistance levels. The remainder of this report focuses on these challenges, and the financing needs to meet these challenges.

2. The need to fight resistance against artemisinin and insecticides.

Growing resistance to artemisinin drugs for treatment of malaria and to pyrethroids, used to treat mosquito nets, are both of global concern. We discuss each in turn.

Every country in the region has adopted artemisinin-based combination therapies (ACTs) as first-line treatment for uncomplicated *P. falciparum* malaria and most retain chloroquine and primaquine for *P. vivax* cases. Data on access to ACTs, either in the public or private sectors, are limited or show wide variations between countries. In the public sector, between 9 percent and 100 percent of patients receive ACT treatment for *P. falciparum* malaria. A great deal of malaria medicines are purchased through private pharmacies and clinics. Treatment has received limited external support in the region, when compared to ITNs and human resource capacity development.

*P. falciparum* resistance to artemisinin was first identified on the Thailand-Cambodia border and is not present in at least four countries in the Greater Mekong Subregion (GMS). Previously widely used malaria medicines became ineffective due to resistance, with spread to South Asia from SE Asia. The potential for resistance development in most acute when oral artemisinin derivatives are used as monotherapy. The regional problem of substandard and counterfeit medicines is also accelerating the rate of resistance development.

![Figure 3: Spread of Resistance to Chloroquine from Cambodia to other parts of the world and spread in Indian CQ failure from 1980-2005](image)

The two major threats to effective ACTs aside from biological selection in resistance are monotherapies, which spread resistance to artemisinin faster and counterfeit drugs. At least 37 pharmaceutical companies produce artemisinin monotherapies and market them in 29 countries. Restrictions on monotherapies have had some impact in Cambodia. However, systematic efforts to reduce monotherapies are needed. For example, the Indian government still distributes artemisinin with SP in a blister pack versus a fixed-dose combination, leading to patients taking only one drug and reducing compliance.

The other major concern is counterfeit drugs. One estimate predicts that counterfeit drug sales will reach US$ 75 billion globally in 2010. It has been estimated that one in five of all malaria deaths are due to drugs which are ineffective. Counterfeit medicines are deliberately mislabelled as branded and generic products that can be toxic and inactive. Surveys have shown that from 38-52% of artemisinin was counterfeited in this region, worsening the burden of disease by decreasing cure rates of malaria and increasing the risk of severe malaria. Aside from counterfeit drugs, there is the challenge of substandard drugs which do not include adequate active ingredients to effectively control disease. Much of the disease burden in the region is associated with migrant populations of working age men who work in forests and mines within endemic areas.

A Global Plan for Artemisinin Resistance Containment (GPARC) was developed in 2011. In 2013, a framework was established by the WHO to guide a coordinated technical and scientific response to artemisinin resistance in the GMS. This work defined effective case management, ideally with microbiological confirmation of diagnosis as having public good characteristics. The cost of containing artemisinin resistance is estimated to be an additional US$180 million for the region as a whole.

In 2013 the GFATM committed US$100 million over three years to a regional grant in the GMS to combat artemisinin resistance in five countries. The Global Fund’s Regional Artemisinin Initiative (RAI) is the result of a collaborative effort between multiple partners and the Ministries of Health in Thailand, Vietnam, Myanmar, Lao PDR and Cambodia. The initiative aims to achieve elimination of P. falciparum malaria by 2016. It recognises that an accelerated national response and a multi-country approach is necessary. The main interventions supported through the RAI initiative include long-lasting insecticide treated nets and targeted IRS, as well as case management in areas where there was evidence of delayed response to ACTs or at risk of spread of resistant parasites. There is also special focus on migrant populations living and working in border areas. The grant is also aimed at helping to halt the marketing and sale of oral artemisinin mono-therapies, which threaten the long-term usefulness of ACTs. It will also set up a rigorous surveillance system linked to control of outbreaks and therapeutic efficacy studies in sentinel sites. China will provide technical support to RAI by sharing experience and best practices.

More radical solutions focused on elimination of falciparum malaria in regions with ACT resistance using a combination of aggressive indoor residual spraying (IRS), long-lasting insecticide nets (LLIN) and even mass prophylaxis with older classes of drugs have been discussed. These require further operational research. An exciting recent development is the identification of a genetic marker for resistance to

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artemisinin (the “K13” protein) which might be turned into field-based diagnostic tests. This new research shows that de novo resistance with at least 4 or 5 “founder” clones is possible. Thus a high priority is to document which conditions predispose to resistance arising de novo (besides the ones already known). For example, almost all conditions exist in India.

Insecticide resistance is far less studied and understood in the region. Historic examples have shown that growing resistance to DDT in India contributed to the large increase in malaria cases in the 1960s. Most of the strategies to use long-lasting insecticide nets (LLIN) that relied on only one major class – pyrethroids – were practicable for use in LLINs. Moreover, the financial incentives for private pharmaceutical or agricultural industry to develop insecticides focused on malaria are limited, although some public private partnerships to develop a new generation of insecticides are underway.

Resistance to pyrethroids has been identified in 64 countries globally. One practical strategy to decrease LLIN resistance is to substitute indoor residual spraying (IRS) with non-pyrethroids with LLINs, which is comparable to strategies used in agricultural pest control or by the Onchocerciasis Control Programme in Mexico. Additional operations research in the Mekong Region by MALVECASIA, a network for monitoring resistance serves as a model for how much better local information can inform local malaria control. Other strategies involve avoiding insecticides that select for resistance to other similar classes and avoiding the use of the same insecticide to kill both adult mosquitoes and mosquito larvae.²

Without accelerated action, these vital tools for fighting malaria might become less effective, and the spread of resistant malaria to India, other Asia, Africa and Latin America might mean sharp increases in malaria deaths.

Greater penalties for counterfeit anti-malarial drugs are required along with operations research and pilot elimination programs. Earlier estimates suggest that the cost of containing artemisinin resistance is estimated to be US$180 million for the region as a whole—which is about 4% of the estimated total investment needs between 2012 and 2015 of around US$4.78 billion. Notwithstanding uncertainties in measuring costs of future interventions, fighting resistance constitutes about 0.5% of the total estimated cost (around US$32 billion) to eliminate malaria in 19 countries by 2030.

We recommend doubling anti-resistance efforts to about $400 million for the following reasons: (1) Align the investment with the proportion typically used in private R&D for new drugs (typically about 5-10%); (2) Expand efforts to combat insecticide resistance; (3) Urgently implement and evaluate novel but high-risk elimination strategies where resistance has already occurred; and (4) strengthen enforcement of counterfeit drugs. The expanded funds should be viewed as insurance for other malaria control efforts and resurgence in the region or in Africa.

Fighting resistance is of global relevance, and constitutes a global public good, and hence its finance needs to draw in countries and agencies not in the region that would benefit from preserving effective tools for malaria control.

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2. The need to engage the private sector

The vast proportions of patient contacts in the region occur in the private sector, mostly as out of pocket payments to treat fever or other symptoms of malaria. The private sector is diverse and includes providers such as doctors, nurses and pharmacists working out of private health facilities, laboratories and pharmacies as well as “unregulated” providers including unlicensed drug shops, general goods shops and itinerant sellers. Traditionally the private sector has been poorly regulated with widespread use of fake drugs, inappropriate treatments and presumptive treatment.

Moreover, there are large amounts of spending on over-the-counter drugs, and in India, consumption of chloroquine and SP continues to rise. Most private providers are unregulated and make products of uneven quality. The best solution in the medium term is progressively universal finance of health insurance, which would move from out-of-pocket to public finance, but likely maintain a wide range of private and public providers. Even within universal health insurance, most drug purchase and delivery would be via the private sector, as is the norm in most high-income countries with universal health insurance.

Effective malaria control in the region need not await the steady expansion of universal health insurance in the region, which would enable much better regulation of private practice. The private sector is assisting the scale-up of malaria programs in remote areas through natural resource and agricultural industries work force support, private health facilities and pharmacies delivering commodities and case management advice, and product development partnerships that can assist innovation and delivery of treatment and insecticides. However, the two most promising approaches involve subsidies for quality-assured ACTs and Rapid diagnostic tests. We discuss each in turn.

A. The Affordable Medicines Facility-malaria.

A method proven effective is the Affordable Medicines Facility - malaria (AMFm) which was used to expand the supply and demand for artemisinin-based combination therapies (ACTs) and is comprised of three prongs: (i) negotiated global price reductions with private pharmaceutical companies to sell ACTs to private importers at the same prices usually sold to public importers; (ii) a high level subsidy designed as a “factory-gate” subsidy paid to the manufacturer so as to lower prices in line with drugs with which ACTs would compete with the less effective chloroquine and SP combination or also artemisinin monotherapies; and (iii) county-specific supporting interventions for regulation and quality assurance.

The AMFm approach has been shown to be highly cost-effective (Figure 4); in sub-Saharan African countries with high child mortality (which might be comparable to selected high transmission areas in Asia such as rural Orissa), spending about $1 million dollars averts about 1,000 child deaths. If each death avoided gains at least 50 good years of life, then the overall cost-effectiveness is about $20 per life year gained, which makes the AMFm one of the most cost-effective interventions in the world. Even in the Asian scenario of lower malaria death rates than in sub-Saharan Africa, about $1 million might prevent “only” 200 deaths (at a cost of about $5000/death avoid), each of which would avoid “only” 20 years of life lost, then the cost-effectiveness is about $250 per life year gained, still making it a very attractive buy for all countries.

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xi Jha P, Laxminarayan R. Choosing Health: An Entitlement for all Indians, CGHR, 2009
A recent independent evaluation after 18 months of the AMFm implementation in 6 African countries showed a sustained increase in the availability and market share of quality-assured ACTs, and a reduction in price (Figure 5). The baseline share of quality-assured ACTs among private providers ranged from 2-12% and rose by more than 30% in absolute terms. This increase in market share safely beat expectations from private pharmaceuticals on shares for a new product. The biggest reductions in street price were seen in the private sector (as the public sector already received discounted drugs), with prices ranging from about $1.3 to $4.8 per dose.
Despite the AMFm succeeding in its pilot phase against nearly all the benchmarks that were established, the board of the GFATM voted in December 2012 to end the AMFm subsidy and instead integrate it with main GFATM operations. This decision was viewed by many critics as the effective slow death of a successful innovation\textsuperscript{xiv}. For reasons that remain unclear, the US government did not support the

\textsuperscript{xii} Laxminarayan R, Gellband H, for CDDEP. Unpublished analyses


extension of the AMFM. Recently, a social marketing experiment in Myanmar showed major increases in the use of ACTs when prices were lowered (1).

The AMFM is highly relevant to Asia-Pacific, given the large private practice, but also to the major, reputable pharmaceutical industry. It is important to understand the fair criticisms of the global AMFM and the relevance of these to Asia\textsuperscript{v}. These are as follows:

1. **Inappropriate use by non-malaria patients.** A fair concern was that the lower price of quality-assured ACTs would be used by non-malarial patients. The African evaluations, including by the Clinton Health Access Initiative (CHAI) showed systematic increases in use of quality-assured ACTs by fever patients in the private sector, which had been the case even prior to the AMFM. Moreover, in Asia about 60% of the malaria contacts in the public sector have a microbiological diagnosis (through slide tests or RDTs), which is much higher than the levels of microbiological testing in Africa. Thus, a hypothetical subsidy in Asia should have less inappropriate use.

2. **ACT use is captured by adults and not by children.** The intended target of the AMFM was to reduce malaria mortality in children. Several surveys have shown that adults consumed a fair amount of the quality-assured ACTs. However, this may not be inappropriate given the poor evidence that malaria is a major cause of adult deaths in India and perhaps in Africa (Figure 6). Most publicly funded malaria programs have little information on fever prevalences and mortality among adults. The results from the Indian Million Death Study showed for example that based on household interviews of those who died (but without microbiological confirmation) acute fevers were a common cause of perhaps some 1.3 million rural deaths among adults before age 70, with malaria being a major contributor. Similar gaps in knowledge about adult deaths exist in many Asian settings where malaria remains common. Conversely, as malaria is not just treatable but curable if detected early, reliance on hospital-based statistics to estimate malaria deaths are likely to be flawed.

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\textsuperscript{v} Fan V. The Future of the AMFM: Making sense from all the noise. Center for Global Development Blog, Nov 8, 2012.

\textsuperscript{xvi} Dhingra ND et al. Adult and child malaria mortality in India: a nationally representative mortality survey. Lancet. 2010 Nov 20; 376:1768-74
3. **Benefits accrue to richer patients (who don’t need the subsidy).** The CHAI report showed that quality-assured ACT use increased among the poorest quintile of children. A forthcoming World Bank evaluation of malaria control in Zambia (which was one of the first countries to adopt ACTs as policy since 2003) shows greater decreases in severe anaemia and parasitemia among the poorest children versus the richest.

4. **Lifesaving drugs should be free to all.** Various charities including OXFAM made passionate claims against giving subsidies to private pharmaceuticals, stating that it was a moral imperative by governments to make essential drugs free to all, and arguing against aiding rent-seeking by private companies. However, this criticism ignores the reality that many patients, especially poor ones will seek private providers. Moreover, the access to public facilities in many rural areas of Asia remains low. The additional profits made by private providers have to be weighed against the benefits of reducing resistance by use of monotherapies, crowding out counterfeit drugs and saving more lives.

**B. The role of Rapid Diagnostic Tests**

There is a need to try to align the private sector with the public health goal of expanding pre-treatment parasitological confirmation of malaria, mostly through rapid diagnostic tests for malaria (which leads to reduced drug resistance, safer use of drugs, and avoids unnecessary treatments). This public health goal has to be balanced against the reality that many patients with fever will ignore a RDT result and take anti-malarials anyway, either in the public or private sector. Indeed, many doctors in both sectors recommend such broad treatment for various anti-microbials.

Would a subsidy to ensure quality-assured RDTs are low cost also increase the appropriate use as shown for ACTs? There is only indirect evidence from social marketing experience in Cambodia where about 70-80% of patients with malaria symptoms seek treatment in the private sector rather than in the public sector and are therefore not recorded in official statistics. Cambodia switched its official policy toward ACT around 2000. Social marketing of subsidised RDTs (Malacheck) and ACTs (Malarine – a blister-packaged artesunate and mefloquine) was initiated and piloted by the EC-malaria control project in partnership with the Cambodian national malaria control programme. The net result was a 50% reduction in RDT price. Malacheck was purchased from the suppliers for an average of $0.29 (range $0.19- $1.25) per test and sold for a mean price of $0.37 ($0.25-$1.25). ACTs were purchased for about $0.50 to $2.00, with similar marks up for the street price as for the RDT. In 2002 before the nationwide rollout, only 18% of interactions between patients with malaria symptoms and private providers resulted in a biological diagnosis and this has been reported to rise to about 70% in recent years. Malacheck market penetration was on average 42% among private outlets, but penetration into villages, problems with stock outs and the lack of surveillance data on uses were limiting factors.

This further suggests subsidies for RDTs might also play an important role, by lowering the price of effective diagnosis in the private sector. However, against this benefit is the practical reality that many doctors in public and private sectors treat RDT-negative patients with ACT anyway, and that many patients expect and want to take anti-malarials.

**We recommend establishing an “Asian Affordable Medicine Facility for malaria” or AAMFM that would build upon the lessons learned from AMFM, including support for both ACT and RDTs.** The crude initial estimate of the cost for such a fund is about $100 million to cover the region.
The AAMFm would need to consider four specific issues. First, would be to ensure that countries are ready and suitable for private sector ACT subsidies. This involves assessing whether countries are suitable for ACT subsidies in terms of malaria epidemiology and the role of private sector in distributing antimalarials, and ensuring supporting interventions are in place. Second, would be the need for centralized set of processes for co-payments, and include manufacturer negotiations, approval of orders, and making payments to manufacturers. One of the early lessons from AMFm was to have a strong, but small central administrative authority. Third, its governance structure would need to ensure that it could remain neutral and not be subject to any one country’s pressures, which unfortunately was the case with the United States and the AMFm. Lastly, any AAMFm would need to leverage the newer systems established by the Global Fund. In the newer model, countries adopt an envelope of funding. Countries will be able to choose whether to allocate some of this funding to private sector subsidies. It may be possible for the AAMFm to support Asian countries in using the Global Fund’s systems for ACT subsidies through the new funding model, rather than set up a new regional system. This would, in turn, depend on how the co-payment mechanisms will operate in the new GFATM model.

We further recommend more studies on Private Sector Participation. The scope for public-private partnerships has not been systematically assessed, and the evidence base on where the private sector has been effective and delivered results in malaria control needs furthering strengthening. Research is required to determine the cost-effectiveness of interventions involving the private sector, such as the AMFm evaluation. The current extent of private sector involvement in the delivery of malaria programs should be assessed in all countries in the region and the possible financial and coverage contribution industry could make to national targets should be appraised. As Additional ideas to explore could include grants, subsidies, tax incentives, manufacturer-based subsidies and in-kind support to influence private provision.

3. Sustainable finance for effective malarial control

A. Current spending patterns:

Current public sector malaria expenditure in the Asia-Pacific is around $280 million per year mostly through governments with sizable contributions from the Global Fund to Fight AIDS, Tuberculosis and Malaria, the US President’s Malaria Initiative, the Bill & Melinda Gates Foundation and the governments of Japan, Australia and the United Kingdom. From 2006-2010 external funding represented about half of public sector financing. In addition to public expenditure large, undocumented financing is derived from private consumption of malaria medicines.

The Global Malaria Action Plan (GMAP) was developed in 2012 to provide a road map for countries to achieve universal coverage with spraying, bed net, diagnostics and treatment interventions. A unit cost approach was used to estimate the resource needs for attaining targets. Unit costs are multiplied by the numbers of people in each country requiring protection from biting mosquitoes, spraying surfaces for mosquito control, RDTS, and ACTs for children and adults.

Financial analysis presented at the 2012 Malaria in the Asia-Pacific Conference and from the GMAP indicated that current domestic support for malaria is large and growing but that domestic contributions vary widely. Total annualised malaria funds over the 2006-2010 period and per capita allocation per person at risk from malaria are provided in Figure 7. It is evident that the largest expenditures are in India and Indonesia, countries which, along with Myanmar and Laos PNG, account for 80% of the regional burden of malaria disease. Per person at risk of malaria annualised expenditures vary.
High per person spending is evident in the Pacific – where countries such as Vanuatu and the Solomon Islands are entering elimination phases.

The proportion of total spending that is domestic versus foreign also varies greatly by country, with malaria control in India, Iran, Iraq, Korea, Malaysia, Pakistan and Thailand being mostly financed out of domestic sources (Figure 8). Government funding does not appear to be strongly linked to the economic wealth of a country. Plotting GDP per capita against government spending per person at risk of malaria in each Asia-Pacific country shows no strong correlation (data not shown). Political will and a commitment to eliminate the disease appear to govern public sector spending. In order to negate the potential for resurgence more countries will have to commit to elimination and allocate greater proportions of health budgets to the disease.

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The uses of the funds are heavily dominated by inputs such as LLINs and IRS, with smaller contributions from treatment and human resource and technical assistance (Figure 9).

The Global Fund has been allocating the majority of its funds to malaria in a number of countries in the region (over 60 per cent of disbursements in Afghanistan, Sri Lanka, Philippines and PNG). However, Global Fund support has fallen significantly since its 2010 peak (Figure 10). Further declines seem likely.

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\text{selected countries 2008-2010 Source WHO}
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\text{Figure 8: Proportion of Public Sector Malaria Funds by Government and Donors for 2006–2010}^{xviii}
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\text{Figure 9: Use of Funds by Sources}^{xix}
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\text{\textsuperscript{xix} Taken from Pearson, M. and Walford, V. 2012. Malaria in the Asia-Pacific: Challenges and opportunities for sustainable financing, October 2012}
given its current funding constraints and its intention to focus available resources on countries’ burden of disease, development level or ability to pay (GNI per capita or Human Development Index).

The majority of countries in the Asia-Pacific region have received significant external funding from the Global Fund, in addition to country-level support.

![Figure 10: Global Fund Disbursements for Malaria in the Asia-Pacific 2003-2012](image)

### B. Financing needs:

The GMAP estimated that the cost of scaling up key services and interventions in the region is around US$1.5 billion in 2014, to which we estimate an additional US$0.2 billion for regional efforts to fight drug and insecticide resistance. When expected government contributions, are taken into account the remaining funding gap to scale up coverage of malaria interventions is estimated to be US$1.6 billion in total between 2013 and 2015 (US$594 million excluding India and China) while the funding gap for artemisinin resistance containment is estimated to be US$90 million. This makes a total funding gap, covering both the scale up of key malaria interventions and artemisinin resistance containment, of US$1.69 billion between 2013 and 2015 (US$684 million excluding India and China).

When projected to 2030, the estimated needs to control and eliminate malaria in the 19 countries analysed is around US$32 billion. A large share of the costs occurs over the next 10 years and most of the costs arise in India and China. LLINs account for just under 30 per cent of 2013 to 2015 funding needs and for some US$9.6 billion over the period to 2030. IRS accounts for just over 22 per cent of 2013 to 2015 financing requirement. RDTs are a significant early proportion of the extra funds, but expected to decline in proportion.

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*xx Taken from Pearson, M. and Walford, V. 2012. Malaria in the Asia-Pacific: Challenges and opportunities for sustainable financing, October 2012*
C. **Closing the financing gap:**

There are several complementary ways for countries to fill the gap between needs and resources. The first is to raise additional revenues for the program. Previous analyses have suggested that if Asian countries were to allocate 2 per cent of their health budgets to malaria the funding gap would be reduced to around US$685 million from 2013-15 (US$260 million excluding India and China). Focused, high-level advocacy to impress upon the key decision makers the success of malaria control, the threat of resistance undermining these, and the economic benefits of control are needed. As shown above, there is a wide variation in support for malaria control programs by governments across the region. All governments need to be convinced of the benefits of malaria control.

Previous analyses by GMAP suggests that investing in malaria could see the number of cases being reduced from 32.7 million in 2010 to around 7.6 million by 2015. Deaths from malaria could also decline from over 54,000 in 2000, and over 43,000 in 2010, to around 10,000 by 2015. Mills and Shilcuttxxi estimated that the value of the benefits achieved through investment in malaria control exceed the costs by a factor of between 1.9 to 4.7 depending on the assumptions used. Investment in malaria could deliver strong health benefits through fewer deaths and less illness that can be valued at over US$49 billion. These benefits exceed investment costs by a factor of two over the period to 2030.

Pilot efforts on novel financing mechanisms should be encouraged. Mobilising domestic resources is a key means of meeting increases in funding needs, although innovative approaches such as malaria bonds, diaspora bonds, Debt 2 Health, airline tax, tobacco taxes, and financial transactions tax could provide some additional finances. Social impact bonds or ‘pay-for-performance’ bonds were identified as one of the more promising innovative instruments. The first malaria bond is currently being designed to support malaria control efforts in Mozambique. Specific studies on the feasibility of these novel financial instruments are needed. For example, an ADB report on tobacco taxes suggested that a 50% increased price arising from roughly a 200% tax increase would yield about $24 billion more in revenue in just 5 countries: (China, India, the Philippines, Thailand, and Vietnam), which would be sufficient to close the financing gap).xxii

D. **Improving the effectiveness of spending on malaria control**

However, we caution that it is not sufficient to simply ask Ministries of Finance for more money for malaria control without commensurate efforts to show more malaria control for the money spent.

More malaria control for money spent would involve two related approaches. First, would be to **strengthen the national malaria control programs** expanding the capacity to manage more complex efforts such as results-based financing (RBF). Current performance indicators have been found to be driven by inputs rather than outputs or outcomes, and are not rigorously measured. Novel RBF approaches such as “Cash on Delivery” which focuses on results and strengthens government accountability could be explored to improve the efficiency of malaria control. There is limited guidance on the use of these approaches in the region, magnitude of required upfront investment, procedures relating to reallocation of unused funds and whether they create any perverse incentives. A review of lessons learnt from other regions and sectors is required, along with the establishment of pilots in the Asia-Pacific to assess the suitability of new RBF approaches. Within large countries, such as India,
national malaria programs should also consider RBF-based approaches to enable local control. For example, the Global Fund is supporting a $10M fund for Elimination of Malaria in Mesoamerica and Hispaniola using a cash-on-delivery model for 10 countries in the region.

National program expenditures are dominated by allocations for bed net distribution, spraying and treatment procurement. With external support possibly declining, available financing will need to be effectively targeted to prevent drug and insecticide resistance and maximise value-for-money from available resources. Morel and colleagues noted “it is important to ask whether current interventions are used appropriately and what is the most cost effective way to scale up activities to the levels needed. In particular, which prevention or treatment strategies, and what combination, are most effective and where?”. The authors investigated the cost-effectiveness of LLINs, indoor residual spraying, case management with various drug combinations, including ACTs, and intermittent presumptive treatment in pregnancy in African settings. Their key message was that “health system decision makers in most countries in sub-Saharan Africa should consider switching treatment strategies to artemisinin based combinations as the foundation of effective malaria control”. This type of analysis has not been conducted for Asia, where most external support and government financing is directed towards bed nets and spraying.

Improving effectiveness of spending on malaria control would include focusing the needs of the malaria program on the most effective interventions, including the global benefits of fighting drug and insecticide resistance. Weak supply chains, poor regulation of the quality of antimalarials and other malaria technologies, and fragmented information systems all undermine malaria control and elimination efforts. The funds available for disease specific (vertical) programs such as malaria are limited, so they need to optimally lever existing health systems investments, such as those which enable treatment. This would require substantial expansion of the epidemiological and evaluation data, notably better estimates of malaria deaths among children and adults in the region (as most deaths occur at home and without medical attention, their causes of death are not known). This data would also serve to document successes and challenges, including the prospects of elimination in some countries. Robust evidence remains the best advocacy and the expansion of surveillance and other tools of accountability would make it easier to build on success in malaria control. In particular malaria elimination cannot rely on one-off or time-limited contributions but require continued support for the development and maintenance of surveillance systems.

Second, there is a need to move donor funding for malaria control away from an input model that mostly focuses on the procurement and distribution of key inputs (most notably mosquito nets) towards more support for operational improvements, capacity building in program management and surveillance and knowledge generation and sharing. The best mechanism to do so is to move countries toward RBF or similar approaches, which have the benefit of aligning incentives for countries to use evidence-based, epidemiologically-sound control practices with the resources available.

E. Establishing the case of Regional Cooperation

Regional cooperation is particularly important as a means to pool resources and support public goods that would otherwise be under-financed. Artemisinin resistance, for example, can only be addressed through a regional approach based on strong regional ownership and collaboration. Resource pooling

could involve transferring national public funds from those countries better able to pay for malaria control to countries with limited financial resources. National investment in regional funds could be leveraged using donor support through matching or other mechanisms. Regional goods and services that could be supported were thought to include R&D, controlling resistance, economies in procurement, capacity development, policy, legislation and evidence-based advocacy. Funds have also been established in other regions for regional malaria control priorities such as these. For example, the Gulf Cooperation Council established a Malaria Control Fund in 2006. This Fund was created by the Ministries of Health in the Gulf countries to prevent re-introduction of the disease in the malaria-free countries and support the efforts of the eliminating and control countries in the region.

The degree of support by Asian countries for regional pooling has not been explored and neither has stakeholder analysis of programming priorities for such a fund. Potential institutional arrangements, which include where such a fund would reside, what governance arrangements would be appropriate and the nature of relationships between financing, implementation and oversight entities need investigation. A number of regional bodies exist including the ASEAN, the Association for Economic Cooperation (APEC), the Asian Regional Forum and the ASEAN +3 all of which reflect the desire to buttress regional strength financially. In 2003, as a result of the emergence of regional and global health epidemics, such as Severe Acute Respiratory Syndrome and Avian influenza, APEC established a Health Technical Forum, subsequently upgraded to the Health Working Group (HWG). The HWG, which first met in April 2013, addresses health-related threats to economies' trade and security, focusing mainly on emerging infectious diseases. A stakeholder survey and review of lessons learned from regional funds in health and other sector should be conducted.

We recommend establishment of a **Regional Asia Malaria or Infectious Disease Fund perhaps to be housed at the ADB**, in close partnership with the GFATM (ensuring explicitly that the Asia Fund does not duplicate the work of the GFATM) as to enable a transition from an input-based model of malaria control in the region to one driven by strong national programs that use evidence to guide decisions. The chief focus would be on regional efforts, including fighting resistance, cross-country links on pharmaceutical policy and access, and linkages of malaria control to other regional efforts, such as pandemic influenza response. The estimated start up size of the Asia Fund is about US$100 million.

### 4. Recap of key recommendations

We recommend that the Task Force consider the following priorities for action:

- Doubling the funding to fight artemisinin and insecticide resistance, including novel, high-risk approaches for elimination of resistance.
- Creation of an Asian Affordable Medicine Facility (AAMF), which would build upon global lessons and work with the GFATM in novel subsidies for quality-assured ACTs and RDTs.
- Additional studies on possible private sector participation.
- Creation of a Regional Malaria Fund to enhance regional cooperation and strengthen national control programs
- Mapping Available National Public Resources and Determining Appropriate Advocacy.
- Greatly expanding surveillance efforts and strengthening mortality statistics.
- Exploring the Feasibility of Innovative Financial Instruments such as malaria bonds.