

Report of Study of Availability of Medicines to Treat “Special Cases” of Malaria in South and Central America

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About SPS

The Strengthening Pharmaceutical Systems (SPS) Program strives to build capacity within developing countries to effectively manage all aspects of pharmaceutical systems and services. SPS focuses on improving governance in the pharmaceutical sector, strengthening pharmaceutical management systems and financing mechanisms, containing antimicrobial resistance, and enhancing access to and appropriate use of medicines.

About PAHO

The Pan American Health Organization (PAHO) is an international public health organization with 100 years of experience dedicated to improving health and quality of life of the communities of the Americas. In the area of medications, PAHO’s greatest contribution is in pharmaceutical policy and its integration within health policy, access, product regulation, and rational use. Additionally PAHO has given technical support for the strengthening of integral supply systems, through a subregional and national focus, facilitating the acquisition of antimalarial products prequalified by OMS for individual countries as well as the Andean subregion.

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Key Words

antimalarials, severe cases, special cases, procurement, availability, Central America, South America

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ACRONYMS

IDA	International Dispensary Association
MSH	Management Sciences for Health
PAHO	Pan American Health Organization
SF	Strategic Fund [PAHO]
SPS	Strengthening Pharmaceutical Systems Program
WHO	World Health Organization

BACKGROUND

Rapid evaluations conducted by the Strengthening Pharmaceutical Systems (SPS) Program of Management Sciences for Health (MSH) during 2007 and 2008 in seven countries, including the Amazon Basin and Nicaragua and Guatemala, showed periodic stock-outs of antimalarial medicines used to treat “special cases” of malaria. For purposes of this study, “special cases” of malaria are defined as severe cases, treatment failures, and malaria in pregnancy. The number of cases of malaria has significantly decreased in most of these countries. Consequently, fewer special cases of malaria occur, so few local providers are interested in selling the small quantities of antimalarials required to treat these special cases. The SPS Program decided to document this problem in the countries of the Amazon Malaria Initiative and Central America and used the opportunity of a Central American regional meeting on supply chain management of antimalarials, held in Guatemala in November 2008, to discuss the preliminary results.

METHODOLOGY

Key informants from malaria programs and departments of medicine of the Ministry of Health as well as colleagues from the Pan American Health Organization (PAHO) in seven South American countries and six Central American countries were requested to provide information to document this problem. A questionnaire developed by the SPS Program and reviewed by the essential medicines consultant of PAHO for Central America, was emailed to the key informants of each country in Spanish or English, depending on their language preference. Reminders were sent when necessary, and visits of SPS staff were also used to help collect the information. Responses were received from 11 countries, that is, all except two: one in South America and one in Central America (annex 1 includes the countries participating in the survey).

FINDINGS

Antimalarials Used to Treat Special Cases of Malaria

All countries in the region use different regimens to treat malaria. The standard regimens are outlined in the country profile documents for Central and South America.^{1,2} However, the current study concerns the antimalarials used to treat special cases of malaria, that is, severe cases, treatment failures, and malaria in pregnancy. Some countries from the Latin American region (mostly in South America) encounter more cases of *falciparum* malaria and therefore encounter more cases of severe malaria, for which a different treatment regimen is required. Countries in Central America have very few, if any, severe cases, and the same treatment regimen is usually used for all cases of malaria.

The medicines used commonly to treat special cases of malaria in South America include—

- Quinine tablets and injection
- Clindamycin capsules and injection
- Artemisinin injections: articulate injection and artemether injection
- Artemisinin suppositories
- Coartem
- Artesunate tablets
- Mefloquine
- Chloroquine injection
- Primaquine tablets

In addition, the antibiotics tetracycline and doxycycline are used in regimens in some countries.

The actual regimens used to treat severe cases, cases of first-line treatment failure (second line), and malaria in pregnancy in the countries under study are shown in annex 2.

Number of Special Cases of Malaria Expected in One Year

Of all the countries in the study, Colombia, Brazil, and Peru (in decreasing order of number of cases) reported the highest number of severe cases. Bolivia, Ecuador, and Guyana have seen severe cases but very few. As stated earlier, in Central America there are very few, if any, severe cases of malaria.

¹ Strengthening Pharmaceutical Program (SPS). 2009. *Situación de la gestión del suministro de medicamentos para el tratamiento de la malaria en los países de Centroamérica*. Submitted to the U.S. Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health.

² Barillas, Edgar, Claudia Valdez, and Silas Holland. 2008. *Situación de la gestión del suministro de medicamentos para el tratamiento de la malaria los países que comparten la Cuenca Amazónica*. Submitted to the U.S. Agency for International Development by the Strengthening Pharmaceutical Systems (SPS) Program. Arlington, VA: Management Sciences for Health.

The actual numbers of special cases of malaria as reported by the countries is presented in annex 3.

Sources of Antimalarials to Treat Special Cases of Malaria

Most countries report using a mixture of sources for the antimalarials needed to treat special cases: some local providers and some international providers. The newer artemisinin-based medicines are in general procured from international providers, but some countries have laws prohibiting international purchase. Older medicines, such as quinine and primaquine, are procured from both local and international providers. Some countries in South America (3/6) state that they purchase such medicines internationally using PAHO as an intermediary with international providers, and two countries report that they use the PAHO Strategic Fund for some or all of the antimalarials for special cases of malaria. Only one country specifically mentioned an international distributor, in this case the International Dispensary Association (IDA), as the source of antimalarials for special cases.

Annex 4 shows the sources of antimalarials for special cases of malaria reported by the countries studied.

Quantity in Stock of Antimalarials for Special Cases of Malaria

In most countries, the reported stock levels of antimalarials for special cases of malaria were high, compared to the actual consumption. For example, the level of quinine injection was over 100 months' of consumption in three countries, and one country reported it has not purchased quinine injection since 2006; its stock levels were sufficient because of the reduced number of cases requiring quinine injection. The actual data are shown in annex 5. Even in Central America, where the first-line antimalarial treatment is also used for special cases of malaria, of which there are very few, the stock levels of first-line antimalarials were high compared to consumption, probably because of the decreasing demand for antimalarials.

Overstocking can lead to expiration of medicines and is a particular problem with medicines that are heat sensitive and have short expiry dates, such as artemisinin-based medicines.

Stock-Outs of Antimalarials for Special Cases of Malaria

Only 3 of the 11 countries reported stock-outs of antimalarials during the previous year, but in two of those (Guatemala and Colombia), the stock-outs were limited to peripheral levels and were resolved by mobilizing stock from other regions of the country. Additionally, the antimalarials for which those stock-outs were reported were not for special cases of malaria but for first-line treatment. PAMAFRO³ reported stock-outs had occurred of quinine injection in

³ PAMAFRO (Proyecto de Control de la Malaria en las zonas Fronterizas de la Región andina) is a project integrating efforts in Ecuador, Colombia, Peru, and Venezuela to reduce malaria in high-incidence areas.

Colombia, Peru, and Venezuela, but they were quickly resolved through either intercountry loans or immediate purchase from PAMAFRO.

One country reported chronic stock-outs of antimalarials for special cases, in this case for malaria in pregnancy, for the whole year, which resulted in treatment interruptions. Strategies used to overcome this stock-out were loans from neighboring countries as well as purchase from an international agency.

Of the three countries reporting stock-outs, two stated they were caused by delay between procurement and delivery, and only one mentioned it was caused by low interest of local providers, stating that the country had no mechanism to purchase internationally. Lack of resources to purchase the medicines as well as problems of stock management at the facility level were cited as possible causes by one country.

The private sector does not present a solution to public sector stock-outs of antimalarials for special cases of malaria in most countries. Only one country in South America reported that private pharmacies stock the specific antimalarials, and in this case, only second-line antimalarials are available and not the treatment for severe cases. In another South American country, various antimalarials were reported to be available in the private sector—especially in areas of poor access—and another country stated that antimalarials were available in the private sector but not antimalarials for special cases of malaria.

In Central America, three of five countries reported that antimalarials were available in the private sector. In one country, Guatemala, the private sector is used as the only source of chloroquine injection for severe cases because the number of cases is so small that no purchases are made on a national level. When a case occurs, the hospital concerned purchases chloroquine injection from a private pharmacy using its hospital budget.

Use of the PAHO Strategic Fund

Of the 11 countries studied, only 3 (Bolivia, Guyana, and Honduras) stated that they used the PAHO Strategic Fund (SF) for procuring antimalarials. Additionally, PAMAFRO (headquartered in Peru) states that it uses the SF to purchase some antimalarials. Bolivia and Honduras reportedly purchase all their antimalarials through the SF and Guyana only some antimalarials, depending on the “medicine, the price, and the type of purchase.”

In general, respondents felt the SF prices were more competitive, although one user of the SF did mention that purchases had a long lead time. Of the 8 countries not using the SF, two gave some reasons; one country mentioned that the slow and complicated SF processes as well as the requirement for prepayment limited its use of the fund, and the other country mentioned that its antimalarial of choice (chloroquine and primaquine fixed-dose combination) was not available through the fund.

CONCLUSIONS

Countries in Central America generally do not have problems procuring antimalarials for special cases because they have very few special cases, and if any occur, they treat with the same antimalarial they use for nonspecial cases. Antimalarials are procured mostly through local providers in sufficient quantities to maintain provider interest. The only exception is Guatemala, where chloroquine injection is used so rarely that it is purchased only in the private sector. Stock levels of antimalarials appear to be relatively high because of decreasing numbers of malaria cases, making procurements unnecessary recently. However, as the number of cases continues to drop, finding local providers willing to provide small quantities of the antimalarials required, such as chloroquine and primaquine, will be more difficult.

In countries of South America where the malaria caseload is divided between *vivax* and *falciparum* malaria, more severe cases occur. Given recent malaria control efforts, however, transmission has dropped; thus, the number of such cases is dropping. This situation has presented some problems in the supply of quinine injection in particular. Additionally, some countries in both South and Central America have legal frameworks prohibiting international purchase of medicines, which makes them totally reliant on local providers. This causes a problem when the provider is not interested in supplying small quantities. In most South American countries, stock-outs either did not occur or have been limited, not interrupting patient treatment, mainly because of PAHO's contribution in obtaining medicines from neighboring countries or effecting emergency purchases through its SF or through international providers, or because the country made emergency purchases through PAMAFRO. However, as the number of cases continues to diminish, it is important to consider a more reliable method to procure these antimalarials for "special cases" of malaria to avoid stock-outs and potential treatment interruption.

Possible Solutions to Stock-Outs of Antimalarials

Given the insufficient availability of antimalarials and scarcity of providers and/or manufacturers in the countries of the region, some possible solutions were proposed during the discussion at the Central American regional meeting on supply chain management of antimalarials in November 2008. These possible solutions are—

- Having individual countries use PAHO's SF for procurement of antimalarials for special cases of malaria
- Pooling procurement of antimalarials for special cases of malaria for a group of countries, using the PAHO/World Health Organization (WHO) Strategic Fund as the intermediate procurement body
- Stimulating interest and capacity in a regional manufacturer to produce antimalarials for special cases of malaria and supply them to the countries of the region

- Stimulating interest and capacity in local manufacturers in individual countries to manufacture antimalarials for special cases of malaria for local use
- Facilitating countries’ use of international providers to purchase antimalarials for special cases of malaria, either through price negotiation by PAHO with prequalified manufacturers or through use of international distributors such as IDA for individual purchasing purposes, using individual country mechanisms or using the SF as an intermediary

PAHO'S STRATEGIC FUND AND OPTIONS TO IMPROVE ACCESS TO ANTIMALARIAL MEDICINES

PAHO/WHO through the Global Fund to Fight AIDS, Tuberculosis and Malaria continues to develop joint actions with Latin American countries to improve availability and access to antimalarial medicines, facilitating and providing technical support in the programming and acquisition of medicines, and acknowledging the challenges the countries face in strengthening national drug supply systems and defining strategies to overcome barriers to improve the availability of good-quality medicines.

The insufficient availability of antimalarial medicines and the limited providers and producers in the region are some of the principal barriers to improving access that these countries have identified.

In the search for feasible solutions, the following alternatives have been proposed and should be considered by the countries in the decision-making process—

- Planning and joint purchase of antimalarial medicines in the countries of the region using the PAHO/WHO Strategic Fund as an intermediary for the acquisition
- Negotiating prices for antimalarials with prequalified providers for individual purchases using the country mechanisms or the SF as an intermediary
- Participating through the SF for individual country acquisitions
- Identifying regional pharmaceutical labs with manufacturing capacity that can respond to the needs of the countries in the region

Mechanisms, advantages, and potential disadvantages of each mechanism are in the following table.

Intervention	Mechanism	Advantages	Disadvantages
Planning and joint purchase of antimalarial medicines in the countries of the region using the PAHO/WHO Strategic Fund as an intermediary for the acquisition	Technical supply units in each country National malaria programs Local PAHO office	Shorter delivery times due to planned production Competitive prices Possibility of loans from the capitalization fund for countries that do not have financing before the purchase	Availability of financing Legal frameworks for some countries that do not allow international purchases with government financing Medicines without sanitary registration No approval before purchasing

Intervention	Mechanism	Advantages	Disadvantages
Negotiating prices for antimalarials with prequalified providers for individual purchases	<p>Technical supply units in each country</p> <p>National malaria programs</p> <p>Local PAHO office(only if antimalarials are purchased through PAHO)</p>	<p>Prices known for a defined period</p> <p>Reduction of prices</p> <p>Use of SF for acquisition at negotiated prices</p>	<p>Providers may not be present at negotiations; previous efforts are necessary</p> <p>Judicial frameworks that do not allow purchases at previously negotiated prices</p> <p>Providers do not have in-country representation for individualized purchases</p> <p>Deliveries do not follow a set schedule because timing may differ for each country depending orders and provider stock and logistics</p>
Participating through the SF for individual country acquisitions	<p>Technical supply units in each country</p> <p>National malaria programs</p> <p>Local PAHO office</p>	<p>Medicines are acquired at PAHO reference prices</p> <p>Loans from the capitalization fund can be used</p> <p>Agreement to participate is very flexible</p>	<p>Prices may not be competitive; at lower quantities, the price is higher</p> <p>Deliveries depend on the manufacturer's stock</p> <p>Problems with availability, low production</p> <p>Delivery times can be greater, especially for products with low demand</p>

For any option that is selected, country commitment , adequate programming of supply, and effective coordination among all the parties involved will be required. Also important are defining short-term and long-term actions for development at the subregional level in the framework of these initiatives, and using the regional mechanism for acquisition of medicines and developing in-country capacity in programming and purchasing of medicines.

What the PAHO/WHO Strategic Fund Offers to Countries as a Procurement Mechanism

The SF includes antimalarial medicines in the list of strategic supplies, which encompasses first- and second-line medicines, prioritizing those used for the treatment of severe malaria cases. The list has been determined based on the treatment guidelines and the lists of basic medicines recommended by the WHO (15th listing). It includes the medicines in the following table.

Antimalarial Medicines Included in the Strategic Fund List

Medicine Name (DCI)	Strength	Presentation
Amodiaquine ^a	150 mg	Tablets
Amodiaquine + artesunate	153 mg (200 mg as hydrochloride) + 50 mg tablet	Tablets
Artemether	80 mg/1 ml	Ampoules
Artemether-Lumefantrine	20 mg + 120 mg	Tablets
Artesunate ^b	50 mg	Tablets
Artesunate ^b	60 mg anhydro-artesunic acid with a separate ampoule containing a sodium bicarbonate solution	Ampoules
Chloroquine	150 mg (phosphate or sulfate) 50 mg/ml (phosphate or sulfate) 40 mg/5 ml	Tablets Syrup Ampoules
Doxycycline	100 mg	Tablets, Capsules
Mefloquine	250 mg (hydrochloride)	Tablets
Primaquine	7.5 mg, 15 mg	Tablets
Proguanil	100 mg	Tablets
Quinine	300 mg 300 mg/ml	Tablets Ampoules
Sulfadoxine + pyrimethamine	500 mg + 25 mg	Tablet

a. To be used in a mix with 50 mg artesunate.

b. To be used in a mix with amodiaquine, mefloquine, or sulphadoxine-pyrimethamine

PAHO/WHO has prequalified and established a list of suppliers of antimalarial medicines who meet WHO quality standards and the technical/administrative standards established by PAHO/WHO. Antimalarials to treat severe malaria cases are procured through the SF and have been prequalified by WHO within the Medicine Prequalification Programme (<http://healthtech.who.int/pq/>).

Currently, the PAHO Essential and Biological Medicines area (THR/EM) is developing a process to assess the new antimalarial medicines included in the SF list, which will broaden the range of providers. Because PAHO currently lacks prequalified providers of antimalarial medicines in the region, PAHO/WHO has taken initial actions to identify manufacturers in the Americas. In this regard, contacts have been made with medicine manufacturers in both the public and private sectors to identify manufacturing capabilities of regional manufacturers. PAHO/WHO hopes to encourage antimalarial production and incorporate these manufacturers in the PAHO prequalification program.

Thus far, 20 countries in the region have signed an agreement with PAHO/WHO to procure medicines through the SF; however, a joint procurement planning must be conducted with the countries and local regulations reviewed to establish the requirements to import the medicines based on each country’s standards and legal documentation.

PAHO/WHO already has identified providers and reference prices to support the countries in the procuring these medicines, based on its previous procurement experiences for first- and second-line antimalarial medicines purchased in eight countries in the region, through which it has acquired quality, cost-effective medicines. The best prices were obtained when joint purchases were conducted for a group of countries.

Issues to Be Considered When Procuring Medicines through the PAHO Strategic Fund

1. The country should sign a cooperation agreement between the Ministry of Health and PAHO/WHO for the procurement of strategic supplies.
2. Based on its procurement plan and local regulations for medicine procurement, the country determines the medicines, technical specifications, and technical/regulating requirements for the procurement of the required pharmaceutical products.
3. The procurement is conducted according to PAHO/WHO technical/administrative acquisition standards and in accordance with SF operational procedures.
4. The countries interested in procuring medicines should make an advance deposit in U.S. dollars through a bank transfer to PAHO. These costs include the following: product cost, freight, insurance, and 3 percent calculated on the total amount for SF capitalization purposes.

5. PAHO/WHO guarantees the procurement quality by prequalifying suppliers and monitoring the procurement in compliance with the technical requirements and required conditions.
6. The country is responsible for importing pharmaceutical products, including verification of purchasing terms and applicable quality control conducted upon receipt and before distribution of the medicines.

ANNEX 1: COUNTRIES PARTICIPATING IN THE SURVEY

South America

1. Bolivia
 2. Brazil
 3. Colombia
 4. Ecuador
 5. Guyana
 6. Peru
-

Central America

7. Guatemala
 8. Costa Rica
 9. Panama
 10. El Salvador
 11. Honduras
-

In addition, a response was received from PAMAFRO,⁴ a malaria control project in the Andean region based in Peru.

⁴ PAMAFRO (Proyecto de Control de la Malaria en las zonas Fronterizas de la Región andina) is a project integrating efforts in Ecuador, Colombia, Peru, and Venezuela to reduce malaria in high-incidence areas.

ANNEX 2: TREATMENT REGIMENS USED TO TREAT SPECIAL CASES OF MALARIA⁵

Country	Bolivia	Brazil	Colombia	Ecuador	Guyana	Peru	Costa Rica	El Salvador	Guatemala	Honduras	Panama
Severe case adult	Quinine inj + Quinine tab Child under 1 year (<i>falciparum</i>) Quinine + Clindamycin	Artesunate inj or artemether inj then mefloquine	Quinine inj + Clindamycin tab + Primaquine	Quinine inj	No STG for severe cases; use first-line treatment (Coartem)	Artesunate inj Clindamycin inj Quinine inj Then oral	Treat with first-line treatment Chloroquine + primaquine or on a case-by-case basis as needed (less than 3% are <i>falciparum</i>)	Treat all cases with first-line treatment Chloroquine + primaquine (FDC)	Chloroquine inj	Treat all cases with first-line treatment Chloroquine + primaquine (No STG for severe cases (<i>falciparum</i> is only 8% of cases))	SP + Primaquine (<i>falciparum</i>)
Severe case child				Artemesinin inj or supp							
Severe case newborn			No cases								
Second-line adult	N/A	Quinine inj then mefloquine	Quinine tab + Clindamycin + Primaquine	Coartem	Artesunate + Mefloquine Or Quinine + TCL Or Doxycycline + Clindamycin with a single dose of primaquine	Artesunate tab Clindamycin tab Quinine tab Mefloquine tab			Not defined	No STG use first-line treatment	Mefloquine + Primaquine
Second-line child	N/A		Quinine tab + Clindamycin + Primaquine	Coartem							Chloroquine for infants
Malaria in pregnancy	Quinine tab	Quinine inj and Clindamycin inj in 1st trimester 2nd and 3rd trimester: Artesunate inj or artemether inj	Quinine inj	Quinine tab + Clindamycin	<i>Falciparum</i> : Quinine tab + Clindamycin Or Coartem (2 nd & 3 rd trimester) Or Artesunate + Clindamycin <i>Vivax</i> : Chloroquine	1st trimester: Quinine (tab) + Clindamycin 2nd and 3rd trimester: Mefloquine + Artesunate		Chloroquine in acute phase, and until end of pregnancy. After delivery, radical cure with chloroquine + primaquine	Chloroquine then primaquine after delivery	Chloroquine	Mefloquine
<i>P. malariae</i>			Chloroquine tab								

inj = injection; tab = tablet; FDC = fixed-dose combination; STG = standard treatment guideline; TCL=

⁵ As reported by the countries.

ANNEX 3: SPECIAL CASES OF MALARIA EXPECTED IN ONE YEAR IN THE COUNTRIES STUDIED

Country	Bolivia	Brazil ⁶	Colombia	Ecuador	Guyana	Peru	Costa Rica	El Salvador	Guatemala	Honduras	Panama
Severe adult cases	23	1,300	7,500	10	8	120–150 adults and children	None reported	20 cases of malaria in 2007. None were severe or treatment failure.	1	10,000 total cases of malaria, of which 800 <i>falciparum</i> . No special cases.	18
Severe child cases	9 15 (under 1 year with <i>falciparum</i>)	500	150	2	5		1		3		
Severe newborn cases	2				0		-		2		
Second-line adult		130		10	0	-	2				
Second-line child		50		2	0	-	1 1 newborn				
Malaria in pregnancy		650	1,200	100	Low	4% of all malaria cases	-		1		36
<i>P. malariae</i>			150								

⁶ Estimated cases.

ANNEX 4: SOURCE OF ANTIMALARIALS USED TO TREAT “SPECIAL CASES” OF MALARIA

	Bolivia	Brazil	Colombia	Ecuador	Guyana	Peru	Costa Rica	El Salvador	Guatemala	Honduras	Panama
Chloroquine			International provider	Local provider		International provider	International or local provider	Fixed-dose combination of Chloroquine/ primaquine from local provider	Local provider	PAHO Strategic Fund	Local provider or International provider*
Primaquine				Local provider		Local provider	International or local provider		Local provider	PAHO Strategic Fund	International provider*
Artesunate tab				International provider	International provider (IDA) or local distributor	Local provider					
Artesunate inj				International provider		International provider					
Artemesinin inj/sup		International provider*		International provider							
Mefloquine					International provider or local distributor	Local provider					Local provider
Quinine tab	PAHO Strategic Fund			International provider	International provider	Local provider ⁷					
Quinine inj	PAHO Strategic Fund	International provider*	International provider*	International provider*		Local provider					
Clindamycin	PAHO Strategic Fund	International provider*		Local provider							
Coartem				International provider	PAHO Strategic Fund						

* Using PAHO as intermediary.

⁷ Reportedly, Peru has not purchased quinine inj since 2006 because the number of cases has dropped significantly and it had sufficient supply. However, in the next purchases, Peru will likely have problems obtaining quinine inj because of the smaller quantities required.

ANNEX 5: QUANTITY OF MEDICINES FOR SPECIAL CASES OF MALARIA IN STOCK⁸ (EXPRESSED IN MONTHS OF AVERAGE CONSUMPTION)

	Bolivia	Brazil	Colombia	Ecuador	Guyana	Peru	Costa Rica	El Salvador ⁹	Guatemala	Honduras ¹⁰	Panama
Chloroquine			7				29		7 ¹¹		31
Primaquine 15 mg			28				3		6		30
Primaquine 7.5 mg							6 (5mg)		5 (5 mg)		207 (5 mg)
Chloroprimaquine adult								18			0.55
Chloroprimaquine child								18			257
Artemether inj		14		0 ¹²							
Artesunate 50 mg tabs				27		21					
Artesunate 250 mg tabs				6 (100 mg)	3 (100 mg)	6					
Mefloquine					12	17					24*
Quinine inj	429	12		660	127	55					24*
Quinine tabs	163				4	5					
Clindamycin tabs	133										
Coartem				980							
Coartem 35 kg					1						
Coartem 25–35 kg					21						
Coartem 15–25 kg					13						
Coartem 5–15 kg					44						

* Amount of stock on hand that will not expire.

⁸ At the time of the study in September/October 2008.

⁹ No stock-out problem because huge quantities of antimalarials are bought for a mass prophylaxis program, so medicines are always available for the few cases of malaria.

¹⁰ No data available but no stock-outs reported for any antimalarials.

¹¹ No chloroquine injection is kept in stock because the number of cases is so small that no national purchase is made. When there is a case, the hospital treating the case purchases from the private sector.

¹² None in stock and unable to procure any.

