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Improving Antimalarial Drug Access and Use

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1 Introduction

The changes in the therapeutic regimens in the countries prompted RAVREDA-AMI to promote lines of work related to improving the availability of antimalarials and their use by prescribers and patients. Pharmaceutical management quickly emerged as one of the most important lines of work.

The rapid changes in therapeutic regimens led to a focus on how to implement them which in turn revealed serious deficiencies in the procurement, distribution, quality, and use of antimalarials in the control programs. The Rational Pharmaceutical Management Plus (*RPM Plus*) Program of Management Sciences for Health, in partnership with PAHO, supported the Malaria Control Programs at the Amazon countries on assessing and strengthening the countries' pharmaceutical management systems in order to improve the availability and use of antimalarials in the region. During 2004–2006, RAVREDA also supported activities to study patient adherence to antimalarial treatments and promoted improvements in practices related to prescribing and dispensing antimalarial drugs.

The approach developed in this component with AMI support can be broken down into four phases that overlap at some points, since the eight countries are moving forward at different speeds (see figure below). In an initial sensitization stage, malaria programs were encouraged to review matters related to drug access and use and to put the topic on Ministry of Health agendas.

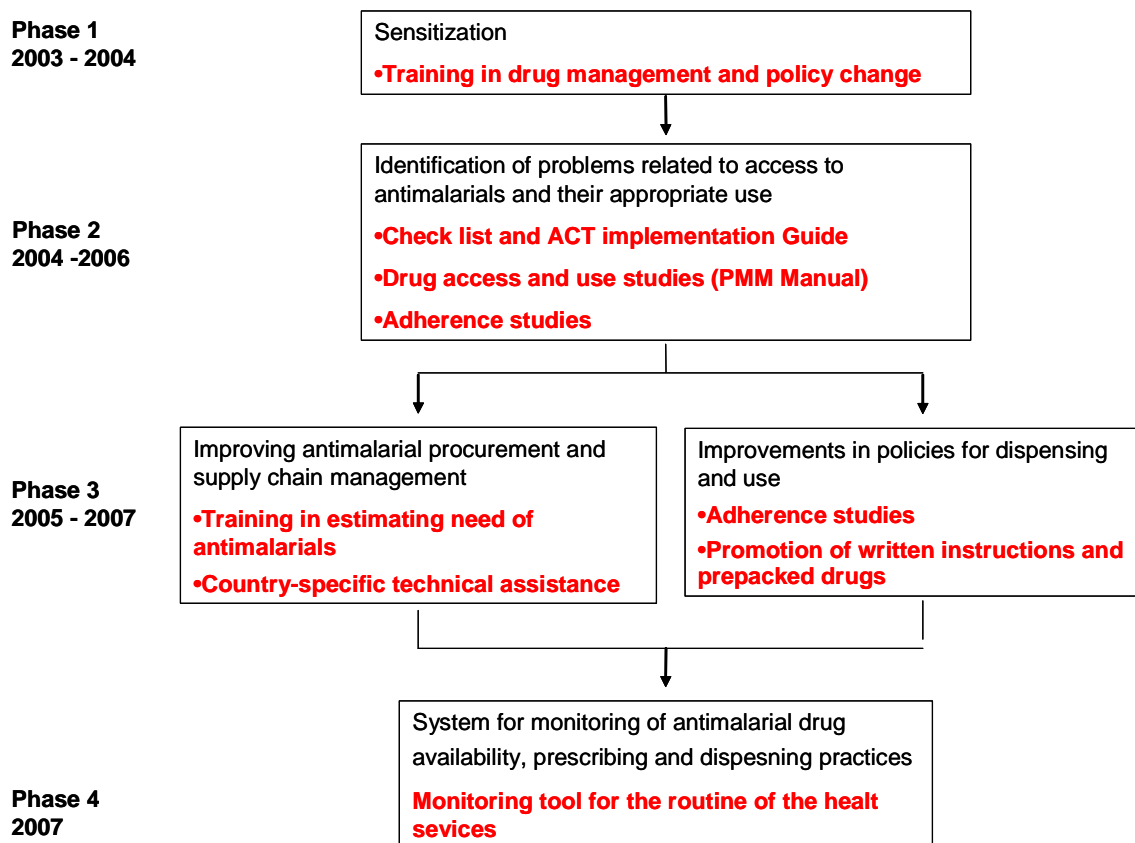
In this **first phase**, two international meetings were held with the participation of the CDC, PAHO, and the *RPM Plus* Program of Management Sciences for Health (MSH).

Identifying problems related to access to and use of antimalarials constitutes a **second phase** of the process. This phase began in 2004 with some preliminary studies on adherence and case management practices and further materialized in 2005 and 2006 with the implementation of a methodology developed by the *RPM Plus* Program/MSH to evaluate the access to and use of antimalarials. The adherence studies were important for raising interest within the control programs in this issue. They found problems of misuse of antimalarials linked to poorly prepared prescriptions. Studies with other quantitative and qualitative approaches complemented this situational diagnosis in some countries. Also as part of this situational-diagnosis phase, the use of guidelines for implementing the ACTs and a checklist of the different components of the drug management cycle were promoted.

The **third phase** has consisted of promoting the adoption of measures to improve access and use. Included in this phase are activities geared to strengthen the forecasting of pharmaceutical needs and the design and adoption of strategies to achieve good patient adherence to the new regimens for the treatment of uncomplicated *P. falciparum* malaria and the treatment of *P. vivax* malaria (measures such as the use of prepackaged drugs and written instructions).

Monitoring is the **fourth and final phase** of the process. The purpose of this phase is to encourage the adoption of systematic monitoring of drug management and compliance with prescription and dispensing procedures in health care. The proposal includes a simplified tool to make health-care network supervision more efficient (see form in [Spanish](#)), an instrument to record inventories, and measures to make the most of the malaria information system as a management monitoring tool.

Figure 1: AMI Approach for Improving Antimalarial Drug Access and Use



2 Methodology

2.1 Sensitization (Raising People's Awareness of the Importance of the Issue and Putting It on Their Agendas)

The first step related to the AMI was taken in 2003 with a workshop coordinated by the CDC and supported by *RPM Plus*/MSH, USP/DQI, and PAHO in Guayaquil, Ecuador. The workshop addressed the process of change in antimalarial policy and the issues to be considered for successful implementation. The policy cycle, the role of the different stakeholders, and the determinants of implementation—including the availability and use of drugs—were reviewed with the countries. At the Guayaquil workshop, the use of an electronic matrix was also promoted to help the central level identify problems in the different processes of the policy cycle and to program concrete solutions. The electronic tool had links with examples and multiple boxes for comments with sections containing the principal recommendations of WHO* on every aspect of the cycle.

In October 2004, MSH/*RPM Plus* held a workshop in Lima, Peru on *Management of Drugs and Essential Supplies for Malaria Control Programs in the Amazon Basin*, with support from USAID/Peru, PAHO, CDC and USP/DQI. MoH representatives from Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru and Venezuela participated in the workshop. The objective was to introduce key concepts in pharmaceutical management, specifically for malaria, and begin strengthening the capacity of the AMI countries to manage antimalarial drugs more effectively through rational selection, prudent procurement, effective distribution, and appropriate use. The workshop also introduced also methodologies for evaluating drug management and estimating needs. These topics were subsequently covered in greater detail during targeted workshops.

2.2 Identification of Problems Related to Access to Antimalarials and Their Appropriate Use

As a follow-up to the Lima workshop, MSH/*RPM Plus* and PAHO held a second workshop in July 2005 to train staff members of the countries' malaria control programs in the use of *RPM Plus' Pharmaceutical Management for Malaria (PMM) Assessment Tool*. Representatives from all eight of the countries participated in the workshop, including Suriname, which had already conducted an assessment of availability and use with MSH/*RPM Plus* in February 2005 and thus could share its experience and lessons learned with the other countries. After the workshop, in 2005 and 2006, AMI encouraged the countries to conduct studies of the availability and use of malaria medicines in their programs using the methodology outlined in the PMM manual. The access and use studies were coordinated by the Ministry of Health of the respective countries with the involvement of some of the RAVREDA collaborating centers to monitor antimalarial drug

* Organización Mundial de la Salud 1994. *Políticas sobre Medicamentos Antimaláricos: Necesidades de información, tratamiento de la malaria no complicada y manejo de la malaria en el embarazo. Informe de una reunión de consulta oficiosa*. Ginebra 1994. WHO/MAL/94.1070.

resistance. *MSH/RPM Plus* provided additional technical assistance to the study coordinators, again based on the countries' specific needs. During this phase, studies were conducted in Colombia, Ecuador, Bolivia, Guyana, and Suriname, in addition to a pilot study in Venezuela. Additional studies on the quality of care and the handling of drugs at the health units, using other methodologies, were also conducted in Ecuador, Guyana, Peru, and Suriname.

During the first years of AMI, the situational diagnosis on antimalarial access and use was complemented with initial adherence evaluation experiences. These evaluations were carried out in Colombia, Ecuador, Bolivia, Venezuela, and Suriname. The findings revealed the problem of patients' failure to adhere to the treatment regimens for *P. vivax* malaria in use in the Region and to the first line of *P. falciparum* malaria management in some countries (Colombia, Venezuela, Suriname). In addition to poor adherence, these initial studies found important deficiencies in issues related to the access to and prescription and dispensing of antimalarials.

2.2.1 Methodology for Drug Access and Use Studies

The *PMM Manual* presents a methodology for evaluating the management of antimalarials by assessing their availability and use and producing objective measures, called indicators, to identify strengths and weaknesses in the system. The assessment uses retrospective (historical) and prospective (immediate future) data collected through both qualitative and quantitative techniques. The manual and its accompanying Data Collectors Guide provide general instructions and sample tools. Countries are expected to adapt the tools and corresponding indicators based on their specific context and need.

The *PMM Manual* consists of two complementary studies, the Drug Availability Study (DAS) and the Drug Use Study (DUS). The purpose of the DAS is to determine the degree to which the medicines recommended for the treatment of malaria are available and to assess the key determinants of availability. Data are collected from MoH public health facilities (e.g. medical supply warehouses, hospitals and clinics), formal private sector health facilities, and retail pharmaceutical outlets. Three data collection techniques are used for the DAS study: document reviews, structured interviews, and physical inventory checks. The purpose of the DUS is to review prescribing and dispensing practices for malaria and to assess their clinical and cost implications. The DUS uses both retrospective and prospective data collection techniques. Retrospective data are collected by reviewing medical records in public and private facilities. Prospective data are collected through direct observation and exit poll interviews in public and private facilities, as well as through simulated purchases in retail pharmaceutical outlets.

2.3 Improving Antimalarial Procurement and Supply Chain Management

In the course of working with the countries, procurement planning was identified as a weak area in several of the malaria control programs. In some of the countries, the procurement process is characterized by poor quantification methods, missed purchasing opportunities,

high purchase prices relative to the international medians, a lack of prequalification of manufacturers, and no systematic practices for quality control of the lots purchased.

As a step towards improving the countries' procurement processes and, in so doing, addressing some of their problems of drug availability, MSH/RPM *Plus* held a workshop in August 2006 in Santa Cruz, Bolivia on methods for the quantification of antimalarials and other supplies. The workshop highlighted the importance of quantification as an essential step in the procurement process and the need for reliable data on malaria case distribution, past consumption rates and inventory status.

2.4 Improvements in Policies for Dispensing and Use

The promotion of better dispensing and use policies is another issue on which AMI/RAVREDA has worked, along with the strengthening of needs forecasting. These endeavors constitute the third phase of the process. An important step in making improvements in antimalarial dispensing practices in the Region was the introduction of prepackaged treatment for *P. falciparum* malaria in several countries (Suriname, Guyana, Brazil, and Colombia). Similarly, AMI/RAVREDA supported studies on patient adherence to treatment in order to identify deficiencies in the current guidelines, in the malaria programs, and in prescription and dispensing and to evaluate the effectiveness of measures that could be adopted by control programs to improve patient use of antimalarials (written instructions, use of blister packs in *P. vivax* malaria, etc.).

In 2005 a meeting was held in Caracas, Venezuela to develop a methodology for addressing the problem of patient adherence to treatment within the RAVREDA framework. One outcome of the meeting was an agreement on a strategy to improve adherence by promoting better standards and practices in the prescription and dispensing of antimalarials. Within this context, adherence studies would be used as a basis for devising better treatment policies and would be complemented by drug use studies in which compliance with such policies could be evaluated. Toward this end, a guide was developed to help the malaria programs carry out adherence studies. The adherence protocols are intended mainly to measure patients adherence to the official treatment regimens recommended by the countries' control programs; therefore, the protocol includes measures (interventions?) to ensure proper prescription of medicines. The complement to this approach, and perhaps the most important component, is the monitoring of compliance with such policies by the health services (item 1.1.1.3.5).

2.4.1 Methodology for Adherence Studies

The measurement of adherence in studies conducted within the RAVREDA-AMI framework prioritizes the quantitative approach. It is based on a questionnaire on how patients took the treatment administered at their home at the end of the consultation and on verification of the number of tablets left over. Patients are seen by staff at the respective health unit. At the end of the workday, the study team chooses patients who meet the selection criteria based on their health care records. The patients are visited at home the day

after they complete the treatment and are asked to participate in the study. During the visit, a questionnaire is administered to identify adherence failures, and the existence of any remaining tablets is determined. In some countries, questions on the causes of adherence failure are included. Adherence failure is classified according to a standard classification based on experiences in other regions (for more information, see Fogg).

The methodology guarantees the fulfillment of two basic precepts:

- (1) dispensing of the full treatment and
- (2) compliance with the prescription according to official standards.

In a subsequent review of the recommendations, it was also agreed that a written record of the prescription would be included. In general, activities at the beginning of the Project, most of them in 2004, failed to control the conditions under which the drugs were prescribed and dispensed. Health workers were informed of the study but no intervention was conducted to guarantee that drugs were properly prescribed to the patients or that a written record was kept of the prescription. As a result, most of these studies had a significant number of patients who could not be considered in the adherence study because they had not received proper instructions. There were even situations in which the patients in the study did not receive the full regimen. Strictly speaking, many of these RAVREDA-AMI evaluations fall into the category of use studies; indeed, they yielded very interesting findings on deficiencies in drug prescription and dispensing.

2.5 System for Monitoring of Antimalarial Drug Availability, Prescribing and Dispensing Practices

In the approach developed by AMI on drug access and use, the last phase was considered to be the design and implementation of a system to monitor conditions and treatment, the availability of antimalarials and essential diagnostic supplies, and compliance with national diagnostic and treatment guidelines.

Malaria treatment in the Amazon region has gradually been integrated into the health services network, but the problem largely continues to be addressed in rural health posts. In this context, many malaria programs have maintained regular supervision of the network of diagnostic posts; however, in general, although these activities entail a great operational effort, especially in the areas with the lowest population density, they do not constitute a monitoring system. Standardized forms are not used in the visits, there are no predefined variables to be recorded, and there is no preestablished routine for handling information. The data are not methodically analyzed, nor are they consolidated for analysis.

Subsequently, based on the experiences obtained through RAVREDA-AMI's access and use studies and with a view to putting the topic on the permanent agenda of control programs, a simple methodology was developed to monitor the availability of antimalarials and diagnostic material and compliance with official malaria treatment and surveillance guidelines.

The proposed approach includes the creation of a hierarchy of supervision and analysis entities and the implementation of three mechanisms for compiling complementary information that can be validated back and forth. In essence, the goal is to use monitoring and communication channels and work routines that already exist but are not structured so as to allow the information to be used systematically. The strategy is based on developing a supervision system that establishes responsibilities and procedures at the different levels of health services to periodically analyze the operation of the treatment and diagnosis network.

The data collection mechanisms consist of:

- Systematizing evaluation of the malaria diagnostic posts through the use of a simplified reporting form during supervisory visits.
- Generating a periodic report on drugs and supplies, to be completed by the same diagnostic post; the report would be sent with the quality control slides or with the morbidity information.
- Establishing analysis routines by using the existing variables in the malaria morbidity information systems related to the management of diagnosis and treatment and promoting a joint analysis of the supervision and epidemiological data.

During the first quarter of 2007, pilot experiences will be carried out to validate the new tool.

3 Results

3.1 Drug Use and Access Studies

Between 2005 and 2006, with technical support from MSH/RPM *Plus*, malaria control programs in Suriname, Colombia, Bolivia and Ecuador conducted studies on availability and use of antimalarials using the methodology and corresponding tools in the *PMM Manual*. Meanwhile, a pilot test was done in Venezuela. This section highlights the most notable results from the studies. Tables 1 and 2 summarize the findings.

Table 1: Other Drug Access and Use Studies (Guyana and Peru)

Access and use of antimalarials drug by miners in Guyana, 2005: A study was carried out to evaluate access and use of antimalarial drugs among miners. The National Malaria Program, the Geology and Gold Mining Commission (GGMC) and the Guyana Gold and Diamond Miners Association (GGDMA) worked together on the study design. The target population was comprised of gold and diamond miners living in camps in regions 1, 7 and 8.	
KAP	Only 11.3% can recognise the primary symptoms of malaria.
IEC	(a) Oral communication identified by 42.5% of the miners.
Best means of providing malaria information	(b) Informational posters placed in health centres and shops identified by 25.1%
	(c) Electronic media identified by 13% (Television, Video, DVD)
Diagnosis	37.6% self diagnose
Treatment	(a) 44.2% don't know the correct treatment for <i>P. falciparum</i>
	(b) 53.6% don't know the correct treatment for <i>P. vivax</i>
	(c) 90.5% don't know the correct treatment for <i>P. malariae</i>
	(d) 79.6% don't know the correct treatment for Mixed <i>Plasmodium spp</i>
	Artemisinin mono-therapy alone is available to 43.1% of the miners
	Only 19% of antimalarial drugs received come from the PHS
	46.7% received malaria treatment from a friend/boss or local shop
	Artemisinin mono-therapy received by 56.2% for malaria treatment in past six months.
Communication	(a) 80.9% were amicable to participating in the study.
	(b) Miners have fixed abodes away from the mining camps
	(c) 55.1% visit home every 1-3 months

Malaria Rapid Assessment Tool (MaRAT), 2006, Guyana

PAHO, MSH/RPM Plus and the National Malaria Program developed a questionnaire, called *Malaria Rapid Assessment Tool* (MaRAT). The assessment was designed to identify specific deficiencies in the supply chain in order to facilitate the integration of the vertical program, including the supply system for malaria medicines and supplies. into the Regional Health Services/ Primary Health Care (RHS/PHC).

The *main findings* included: the absence of re-ordering forms (CRIVs) and stock ledgers at facility level; lack of knowledge concerning the use of the CRIV form and stock ledgers; poorly defined functions and responsibilities; lack of supervision; inadequate definition and understanding of the reordering cycle; poor storage practices and standards at the facility level; minimal integration of malaria medicines and supplies with other essential medicines and supplies.

The *general conclusion* was that, one year after the integration mandate, there were still gaps and a lack of clear definition of roles between the RHS and the VCS.

Evaluation of the implementation of mefloquine-artesunate and sulfadoxine/pyrimethamine-artesunate combination therapies for *Plasmodium falciparum* infections in Iquitos-Loreto and Piura, Peru, 2003-2004 (WATCHMAN Project), Naval Medical Research Center Detachment (NMRCD) of the United States Navy in Lima, the National Institute of Health, the Health Bureaus of Piura II and Loreto, and the CDC in Atlanta.

Objectives: To evaluate TCDA implementation issues related to patient compliance, acceptability/ health worker and patient preferences, effectiveness of training for health workers and of health education programs, adverse drug reactions (ADRs) to SP-AS and MQ-S, and the availability of combination therapy in the health system.

The *methodology* was based on qualitative and quantitative instruments.

The following *findings* should be noted:

- 87-93% of the patients accepted and complied with the treatment.
- 23-30% of health workers did not give TDS.
- 81% of the patients diagnosed with *P. falciparum* malaria received the proper dose for their weight (**effectiveness of the training**);
- 90% of the health workers explained the effects of the malarial/ADRs to the patients;
- Of all health establishments evaluated, 40% experienced drug shortages, mainly of artesunate, at least once during the four scheduled visits.

Table 2: Access and Use Studies Based on *RPH Plus' Pharmaceutical Management for Malaria (PMM) Assessment Tool, 2005–2006*

Component	Level	Indicator	Bolivia	Colombia				Venezuela	Ecuador				
				Central	Antioquia	Córdoba	Nariño		Central	Esmeraldas	Manabi	El Oro	
Access	National	% average international price paid	110	800.4	N/A	N/A	N/A	102	300	N/A	N/A	N/A	
	National/ departmental warehouses	% available antimalarials	57	88.9	66.7	44.4	0	92.2	41.2	33.6	48	42	
		% time of antimalarial shortage	46	16.5	26.2	45.8	--	--	62	78.1	56	50	
		% registries matching physical count	83	88.9	77.8	0	--	--	60.4	72.2	73	39	
	Local warehouses	% available antimalarials	--	N/A	37.0?	N/A	77.7	--	N/A	33.9	48	42.3	
		% time of antimalarial shortage	--	N/A	29.9?	N/A	8.5	--	N/A	78.1	55.5	50.3	
		% registries matching physical count	--	N/A	5.5?	N/A	77.8	75	N/A	72.2	73.5	39	
	Health centers	% available antimalarials	78 (I) 47 (II)	N/A	68.4	51.9	57.4	65	N/A	33.6	48	42	
		% time of antimalarial shortage	--	N/A	17	16.1	0.04	--	N/A	78.1	56	50	
		% health centers with kardex registry	24	N/A	--	--	--	33.3	N/A	--	--	--	
		% registries matching physical count	--	N/A	20	3.4	64.4	67.5?	N/A	72.2	73	39	
	Use	Health centers	% health centers with care guidelines	--	N/A	100	6.7	100	42.3	N/A	95	95	98
			% health workers with care guide	96	N/A	--	--	--	--	N/A	--	--	--
% consultations with treatment consistent with guidelines			90	N/A	92.2	61.4	65.6	89.4	N/A	85	73	89	
% consultations with prescriptions where drug supply is adequate			91	N/A	92.9	57.2	96.9	98.8	N/A	93	74	89	
% prescribed drugs actually dispensed			90	N/A	100	89.3	100	98.8	N/A	*1	*1	*1	
% patients who could correctly describe how to take their meds			52	N/A	100	55	92.9	68.4	N/A	*1	*1	*1	
% healthcare staff using written instructions			51	N/A	--	--	--	--	N/A	--	--	--	
% pharmacies providing information on use			--	N/A	--	57.1	92.9	--	N/A	10	12	0	

(I) = primary-care level

(II) = secondary-care level

*1 = no data counted due to low number of patients

3.2 Adherence Studies

The problem of adherence was first addressed within the RAVREDA-AMI framework in 2004 through evaluations carried out in Bolivia, Colombia, Ecuador, and Venezuela. These early studies were important for raising interest within the control programs in this issue. They found problems of misuse of antimalarials linked to poorly prepared prescriptions (Table 3).

Table 3: Adherence Studies, 2004

Country	Place	Year	Species	Medication	Prescription Control	Evaluated	Adherence Failures		With Leftover Tablets	Lacking Prescription
							No	%		
Colombia	Tierralta	2004	<i>P. vivax</i>	CQ+PQ 14 d	No	80	33/38	87	15/38	42
Colombia	Guapi	2004	<i>P. falciparum</i>	AQ/CQ+SP	No	32	9	28.1		5
Ecuador	Milagro	2004	<i>P. vivax</i>	CQ+PQ 14 d	No	90	65	72.2	61	1
Ecuador	Milagro	2004	<i>P. vivax</i>	CQ+PQ 7 d	No	90	11	12.2	11	0
Ecuador	Huaquillas	2004	<i>P. vivax</i>	CQ+PQ 14 d	No	71	18	25.4	16	4
Ecuador	Esmeraldas	2004	<i>P. vivax</i>	CQ+PQ 14 d	No	65	34	52.3	17	27
Ecuador	Esmeraldas	2004	<i>P. vivax</i>	CQ+PQ 7 d	No	90	18	20.0	12	14
Bolivia	Guayaramerin	2004	<i>P. vivax</i>	CQ+PQ 7 d	No	89	32	36.0	17	12
Bolivia	Riberalta	2004	<i>P. vivax</i>	CQ+PQ 14 d	No	90	43	47.8	10	16
Venezuela	Tumeremo	2004	<i>P. vivax</i>	CQ+PQ 7 d	No	51	6	11.8		
Venezuela	Tumeremo	2004	<i>P. vivax</i>	CQ+PQ 14 d	No	51	8	15.7		
Venezuela	Atures	2004	<i>P. vivax</i>	CQ+PQ 7 d	No	60	20	33.3		
Venezuela	Atures	2004	<i>P. vivax</i>	CQ+PQ 14 d	No	60	19	31.7		
Venezuela	Tumeremo	2004	<i>P. falciparum</i>	Q + PQ	No	57	10	17.5		
Venezuela	Atures	2004	<i>P. falciparum</i>	Q + PQ	No	60	22	36.7		
Suriname	Paramaribo	2004	<i>P. falciparum</i>	Coartem	No	39	2	5.1	2	0

After the meeting in Caracas, where new recommendations were made for adherence studies, between 2005 and 2006 Bolivia, Brazil, Colombia, and Ecuador made progress in carrying out new adherence evaluations. Although not all the new studies on recommendations for controlling prescription practices incorporated the new classifications, the results were nevertheless highly relevant (Table 4).

Table 4: Adherence Studies 2005–2006

Country	Place	Year	Species	Medication	Prescription Control	Evaluated	Adherence Failures			Probably Adhering
							<i>Not adhering</i>	<i>Probably Not Adhering</i>	<i>% Total Adherence Failures</i>	
Bolivia	Guayaramerin	2005	<i>P. vivax</i>	CQ+PQ 7 d	Yes?	89	17	32	53.0	57
	Riberalta	2005	<i>P. vivax</i>	CQ+PQ 14 d	Yes?	90	10	43	57.8	47
Brazil	Bragança - Augusto Correia	2005	<i>P. vivax</i>	CQ+PQ 7 d	No	94	4		4.0	90
	Colniza	2005	<i>P. vivax</i>	CQ+PQ 7 d	No	115	8		8.0	107
	Tucuruí & Cachoeira do Piriá	2006	<i>P. falciparum</i>	Q(3d)+D(5d)	Yes	93	20	2	22.2	71
Colombia	Apartadó	2005	<i>P. vivax</i>	CQ+PQ 14 d	No	61	6	4	12.6	51
	Apartadó	2005	<i>P. falciparum</i>	AQ+SP	No	22	1	2	10.1	19
Ecuador	Esmeraldas, Sto. Domingo, Milagro, Machala	2005	<i>P. vivax</i>	CQ+PQ 7 d	Yes	101	20	20	39.8	61

4 Actions taken

4.1.1 Improving Antimalarial Purchasing and Distribution Processes

- In Bolivia, with the findings of the access and use study, the *Strategic Malarial Drug Management Plan* was prepared. The aim of the project was to provide strategic guidelines on malaria drug management to support the policies of the National Malaria Program adhering to the standards of the Unified National Drug System.
- In Brazil, a workshop on antimalarial management was held in 2006, attended by the professionals responsible for guaranteeing the supply of antimalarials in the Amazon States. The course was coordinated by the General Coordination Office of the Ministry of Health's Malaria Program, addressing the issues and using the instruments worked on at RAVREDA-AMI's regional workshops.
- In Colombia, participants from the Lima workshop replicated the course in two endemic regions and with the Departmental Secretariats of Health, established the use of an instrument for forecasting antimalarial needs based on the methodology developed with MSH.
- In Ecuador, the NMES also adopted a methodology at the central level for forecasting needs. RAVREDA's coordinating office in the NMES prepared a guide on good antimalarial storage practices to provide orientation at the provincial and local levels on better handling of drugs, and in 2006, two workshops on drug management and good storage practices were held, attended by warehouse managers from the NMES' area headquarters and main office's warehouse.
- In Guyana, a new drug supply channel was determined, and measures to improve the procurement, distribution, and handling of drugs were decided upon. In 2006, the morbidity information was used with the *Quantimed* program, to calculate antimalarial needs. A training course was offered on the use of the software. Training was also provided on the use of the drug requisition registry, and educational materials were developed.
- The study on antimalarial drug use and access in mining areas promoted the elaboration of a plan of action supported by a Memorandum of Understanding signed in October, 2006. To date, the mining companies have been registering to participate; and the first company has a miner trained as microscopist in the Malaria Program. DG and TTO will start according to treatment guidelines. An IEC strategy was developed and materials are being developed in English and Portuguese.

4.1.2 Improvements in Policies for Dispensation and Use

- Introduction of a pre-packed treatment for uncomplicated *P. falciparum* malaria (Coartem®) in Guyana, Suriname and Brazil and as a high impact intervention in Colombia.
- Interest and participation of Brazilian MoH for evaluating the implementation of a fixed-dosage formulation of the MQ+ASU combination (Brazil).
- Use of written instructions in the treatment of *P. vivax* malaria (Ecuador).
- Implementation of a CQ+PQ (7d) regimen in Ecuador and Colombia for the treatment of *P. vivax* malaria.
- In Guyana and Venezuela, primaquine was requested in blisterpacks for the purpose of improving the adherence to treatment among patients.