EVALUATION OF THE HOME BASED MANAGEMENT OF MALARIA STRATEGY IN RWANDA
2008

April 2009

This publication was produced for review by the United States Agency for International Development. It was prepared by Ciro Franco, Joan Schubert and Mathias Yameogo on behalf of USAID/BASICS; by Jane Briggs, Willy Kabuya, Felix Hitayezu and Patrick Gaparayi on behalf of the Strengthening Pharmaceutical Systems (SPS) program; and by Aline Rwanuza, Epiphanie Nyiraharerimana, Francois Niyitegeka, Cathy Mugeni and Corine Karema from the Ministry of Health, Rwanda.

Recommended Citation
Franco, Ciro et al. 2008. *Evaluation of the Home Based Management of Malaria Strategy in Rwanda: 2008*. Arlington, Va., USA: Basic Support for Institutionalizing Child Survival (BASICS) and Strengthening Pharmaceutical Systems (SPS) for the United States Agency for International Development (USAID).

Support for this publication was provided by the USAID Bureau for Global Health

BASICS (Basic Support for Institutionalizing Child Survival) is a global project to assist developing countries in reducing infant and child mortality through the implementation of proven health interventions. BASICS is funded by the U.S. Agency for International Development (contract no. GHA-I-00-04-00002-00) and implemented by the Partnership for Child Health Care, Inc., comprised of the Academy for Educational Development, John Snow, Inc., and Management Sciences for Health. Subcontractors include the Manoff Group, Inc., the Program for Appropriate Technology in Health, and Save the Children Federation, Inc.

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.

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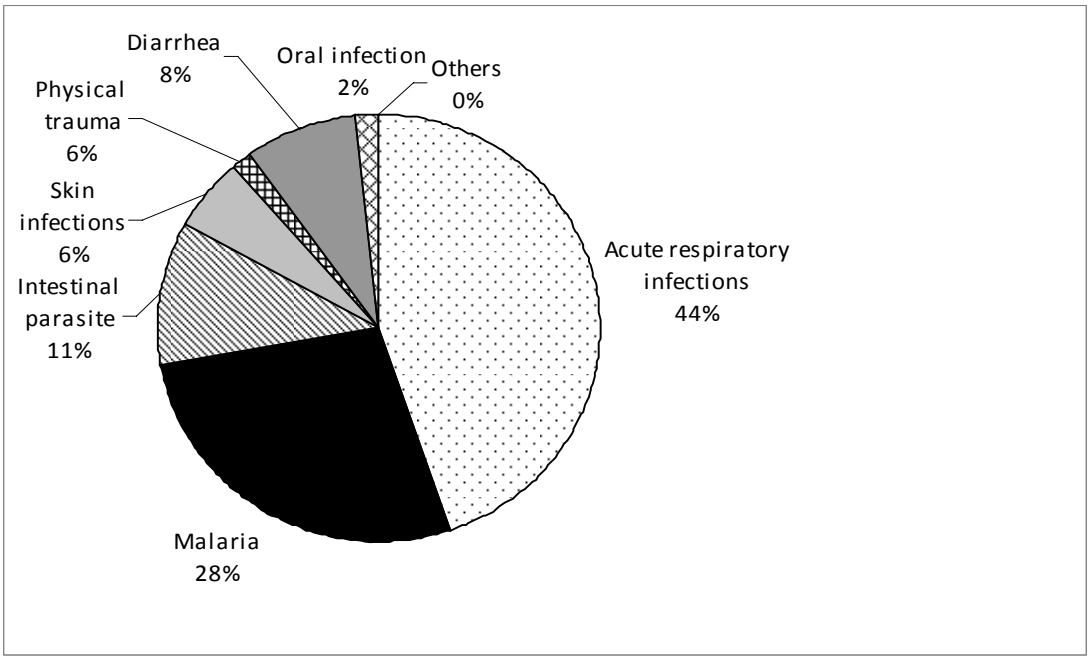
ACKNOWLEDGEMENTS

The authors would like to express special thanks to the Ministry of Health of Rwanda, USAID, and the Global Fund, as well as the data collectors, community health workers, data analysts, and community members from Kirehe, Kamonyi, Nyanza, Nyamasheke, Gasabo, Rwamagana, Gicumbi, Gakenke, whose time and efforts made this assessment a success.

BACKGROUND

Malaria is one of the major causes of morbidity and mortality in Rwanda. In 2007, malaria represented 15% of all reported illnesses, 21% of the top ten reasons for care-seeking in the population and 28% of the top ten reasons for care-seeking in children under 5 (figure 1). Malaria accounted for 22.3% of mortality in children.

Figure 1: Reasons for care-seeking amongst children under the age of five in Rwanda in 2007 (SIS 2007)[1]



Rwanda's national investment in malaria has doubled since 2003, with community interventions receiving a larger share of resources, reflecting their important role in providing home-based malaria care and bed net distribution.[2] With a marked increase in LLIN utilization and improved access, the MOH has been able to achieve a reduction in mortality and morbidity.

Surveys of malaria indicators conducted in 2007 revealed a parasite prevalence rate of 2.4% amongst 2,842 children under 5 years of age who were evaluated.[3] This prevalence has been confirmed by the Interim DHS, in which a parasite prevalence of 2.1% was noted.[4]

Development and piloting of the HBM Strategy

One of the Rwandan government's key strategies to control malaria is increasing the percentage of children under five years of age that receive correct treatment for malaria within 24 hours of the onset of symptoms.

To achieve this strategy, the Integrated National Malaria Control Program (INMCP) developed a strategy for home-based management of fever (HBM) in 2004, using WHO guidelines as a foundation. The strategy was piloted in six pilot districts, which were selected

[1] Malaria cases are defined as "Confirmed Malaria" and "Presumptive Malaria"
[2] National Health accounts Rwanda 2006, HIV/AIDS, malaria, reproductive health subaccount.
[3] Global Malaria Control and Elimination: Report of a malaria technical review 17-18 January, 2008 Geneva Switzerland WHO.
[4] Interim Rwanda DHS 2007-2008.

based on malaria epidemiology and the availability of partners to support community interventions. Following recommendations from an external evaluation conducted by USAID/BASICS and RPM Plus[5] in October 2006, the INMCP proceeded with a progressive expansion of the HBM strategy to cover all the endemic districts, in collaboration with partners.

Notably, the initial policy recommended the use of AQ/SP to treat uncomplicated malaria in children under five at the community level. However, in late 2006, the MOH changed its malaria treatment policy from AQ/SP to an ACT, artemether/lumefantrine (Coartem), which was distributed under the local brand name PRIMO in all public and faith based-supported health facilities. In 2007, artemether/lumefantrine was adopted to treat children under five at the community level. Similar to the previous HBM blisters of AQ/SP, PRIMO is also the public sector blister of artemether/lumefantrine (Coartem) available through the public sector in a red package for children 6-35 months and a yellow package for children 36-59 months. The new packaging includes pictorial and local language instructions on how to give the medicine adapted for audiences with limited literacy.

Previously-trained community health workers were re-trained in 8 districts with support from USAID funded PMI partners to treat with PRIMO while the rest were trained with the support of the Global Fund.

Implementation of the HBM Strategy

By May 2008, community case management of malaria had been fully implemented in 12 districts among the 19 endemic ones and 2 non-endemic districts (Gicumbi and Gakenke) through the training of 7,783 community health workers. The INMCP is now piloting the use of Rapid Diagnostic Tests (RDTs) by community health workers in those non-endemic districts. To date, 253 community health workers have been trained in the use of RDTs.

Since the start of the HBM strategy, communities are involved in selecting community health workers. The program is introduced by local leaders to the public during a meeting, and according to the community health policy, a man and a woman are chosen in each mudugudu (smallest administrative area) during an open election process to serve their respective area.

District level health staff (supervisors and 2 hospital nurses from each district) and at least 2 staff members per health center were trained as trainers of HBM. They then trained the community health workers in signs and symptoms of simple malaria, as well as how to identify danger signs that require referral to a health facility and how to treat presumed simple malaria cases in children under five years of age with the exception of 2 new non-endemic districts where RDTs are being used.

A multi-level supervision plan has been developed, through which the districts are supervised by the INMCP and the health centers by the districts. Designated health center personnel (HBM focal points) supervise community health workers, focusing on ensuring quality of patient care and pharmaceutical management. Community health workers are supervised on-site and also attend monthly meetings at the health center level.

Standardized data collection forms were deployed at all levels, including for monthly reporting consumption of ACTs, number of cases consulted, number of cases treated, number of referrals, and funds collected. Each month, community health workers are expected to prepare a report which is turned in during their monthly meeting at the health center. After verification by the HBM focal point, combined reports are sent to the District Hospital and then to the INMCP.

[5] External Evaluation of the Pilot Phase of Home-based Management of Malaria (HBM) Program in Rwanda, Barat, Lawrence et al 2006

The INMCP Health Information System (HIS) shows that 85% of all children under five who are seen by CHWs are seen within 24 hours of the onset of fever. These data represent information collected by the CHWs and sent to the INMCP through the District for 2008.

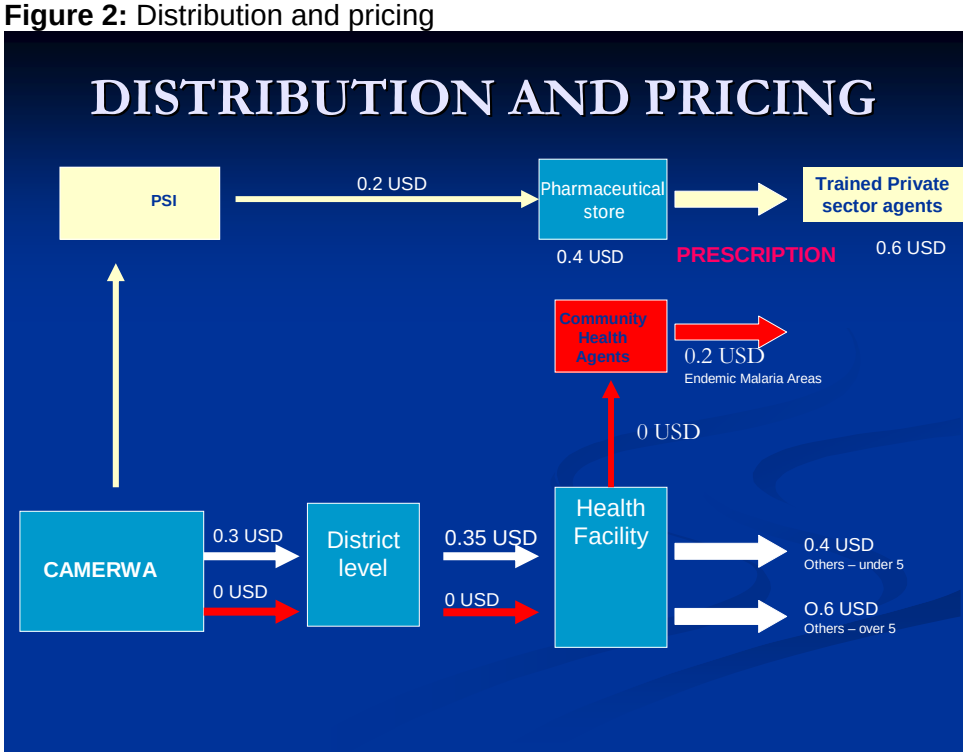
ACT distribution and pricing in Rwanda.
Rwanda took a new integrated public/private approach to increase access to ACT. ACT delivery was integrated through 3 sectors countrywide. Generic artemether/lumefantrine (AL) was initiated in the public and faith based supported health facilities (hospital and health centers) in 2006. The community was targeted through HBM in 2007 and also in 2007 ACT was introduced into the private sector using PRIMO.

Primo ® is the registered ACT drug for sale in pharmacies, drug stores, dispensaries, private clinics, CHWs. Staff in private outlets have been trained and an accreditation program set up for the outlets. All providers in the pubic and private sector have treatment algorithms to guide dispensing and referral actions.

CAMERWA is the national entity that procures the stock of ACTs. Distribution of PRIMO in the public sector is achieved through a "pull" system, whereby community health workers travel to the health center to replenish stocks. In turn, health centers procure from the relevant district pharmacy, and district pharmacies procure from the central medical store (CAMERWA) for free. The CHWs receive their stock of PRIMO at no cost, and they then charge a fee of 0.2 USD (100RwFr) when it is dispensed to the caregiver. Financing for the medicines has been provided by the INMCP, through contributions from partners such as USAID/PMI and The Global Fund.

CHWs are instructed to fill and transmit a monthly report to the health center on management (use) of medicines. Data provided are compiled at the health center and sent monthly to the district pharmacy where a compiled report is sent to the central level (PNILP and CAMERWA) on a quarterly basis. The quarterly report is designed to include both the quarterly report and the requisition of medicines for subsequent quarters.

Figure 2: Distribution and pricing



(source INMCP)

For the private sector, as shown in figure 2, the flow is different as the PSI sales team is responsible to supply the private outlets. PSI officially requests transfer of stock to the INMCP warehouse, where the product is over-packed in the protective PRIMO envelope. With PSI and PTF, the INMCP trains the staff of the pharmacies and *comptoir pharmaceutiques* who are registered with MOH to dispense medicines in Rwanda and only then can the outlet obtain the product. PSI only sells and delivers directly to Depot Pharmacies or wholesalers, which are licensed to import drugs. They buy directly from the INMCP through PSI (on a cash-only basis) in large quantities of 20 packs of 20 blisters (400 blisters total), and sell in smaller quantities of 20 blisters to individual retail pharmacies and *comptoires* who are already purchasing other products from them. PSI also supports these Depots with product promotion to their retail customers, to convince the retail pharmacies to buy PRIMO. The retail pharmacies carry the product back to their stores. Occasionally, PSI conducts "Rapid Outlet Creation", where stock is borrowed from the wholesalers, and taken by INMCP or PSI staff to the retailers in the Districts, to convince the retailers to buy PRIMO. If they buy, the money is returned to the wholesalers. The retailers are then encouraged to re-supply from the Depot wholesalers in their usual way as this is the most efficient and effective way to maintain stock and avoid stock out for example waiting for PSI to return.

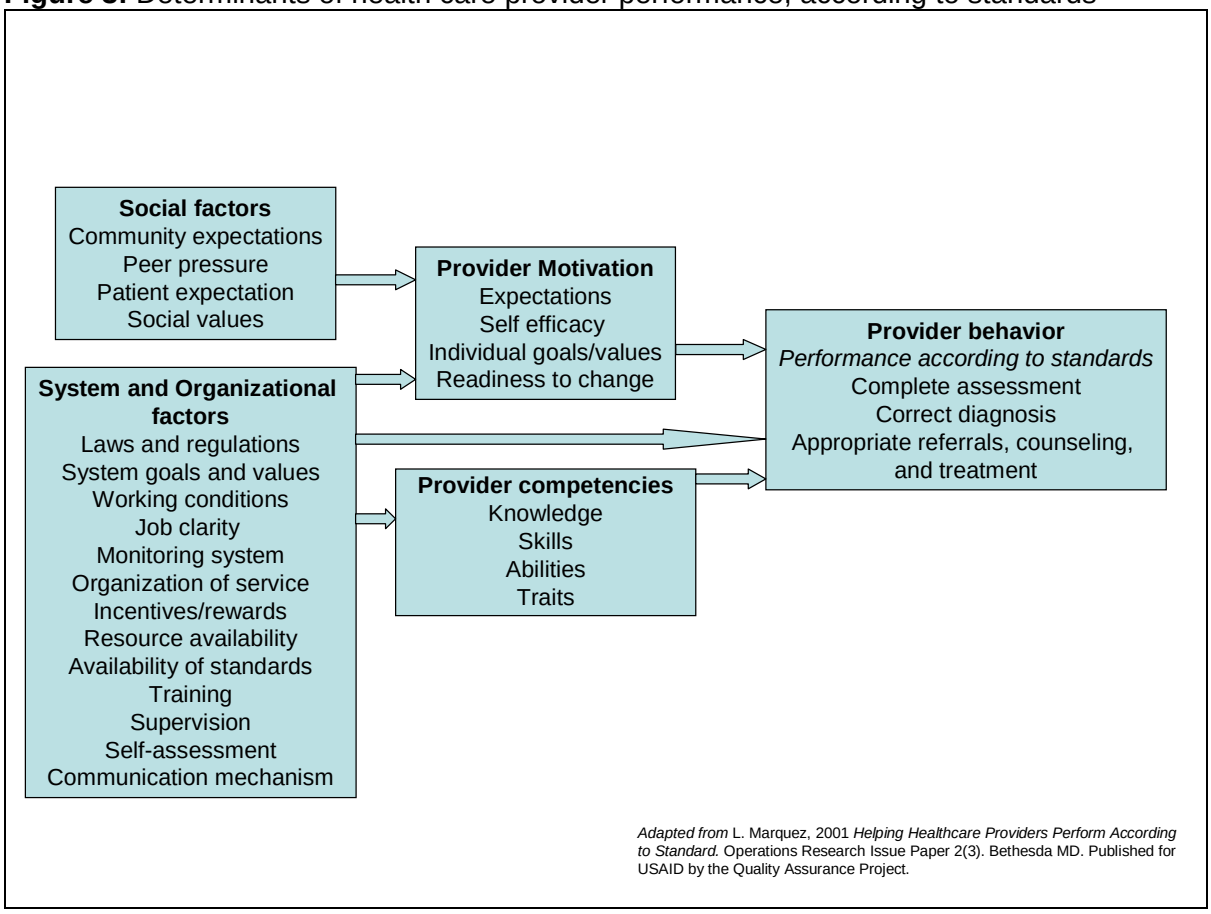
Rationale and goals for the ACT Assessment

The assessment summarized in this report was commissioned by the National Malaria Control Program (INMCP) as an external evaluation of Home-based Management of Malaria (HBM) program in the light of the change of treatment from SP/AQ to PRIMO. Financing and technical support was provided by USAID/BASICS in partnership with USAID's SPS Program of MSH and the Global Fund. The assessment was specifically designed to provide information that will help strengthen the HBM program in the context of Coartem/PRIMO use and focused on the following questions:

* Are community health workers and private sector counter assistants performing according to standards (complete assessment, correct diagnosis, appropriate referrals, counseling and treatment)?
* Is it feasible (proper performance and acceptability) to use RDTs at the community level?
* What are the factors that facilitate (or hamper) the performance of community health workers and private sector counter assistants? How do communities view the HBM program and the services being provided by the CHWs?
* Are caretakers compliant with treatment?
* What are the factors that keep the caretakers from seeking prompt treatment for their children?
* What lessons can be learned from the implementation and initial scale up of PRIMO at community level that will strengthen community worker performance and further scale-up?

In order to carefully answer these questions, it is helpful to have a framework for understanding worker performance. The figure below presents a model for performance, examining several antecedent factors: factors at the worker level (CHW competence, CHW motivation) and factors operating in the community (expectations, social values) or the health systems level (resource availability, incentives, training, supervision, monitoring, organization of service, etc). This framework served as a basis for determining indicators for data collection and as the basis for analysis and interpretation of results.

Figure 3: Determinants of health care provider performance, according to standards



METHODS

Sampling and site selection

Eight districts were chosen by the INMCP for this assessment using the following criteria:

* Four (4) endemic districts that had experience with HBM before shifting from AQ/SP to PRIMO and were included in the 2006 assessment sample: Kirehe, Nyanza, Nyamasheke and Kamonyi
* Two (2) endemic districts that started the HBM directly with PRIMO: Gasabo and Rwamagana
* Two (2) non endemic districts that are piloting RDTs and treating with PRIMO: Gakenke and Gicumbi

In one of the eight districts (Kirehe), all of the community health workers from four health center areas are in the process of implementing an integrated community case management approach that addresses acute respiratory infections (ARI), diarrhea, malaria, and nutrition, according to the information received by the survey team prior to the survey. In the other seven districts, the community health workers are responsible only for malaria community case management. All CHWs regardless of the district had received the same malaria management training.

In each district, 4 health centers (2 located near the district hospital and 2 further away) were randomly selected for this evaluation by drawing names from a hat. For the qualitative component of the assessment, health centers and the communities they represent for each district were chosen by randomly selecting numbers that applied to a list of all health centers for the area.

Methodology
A five-part methodology was developed to address the Terms of Reference, as follows:

1. Review existing information, including surveillance data and reports of previous evaluations from partner agencies and INMCP.
2. Assess community perceptions and opinions related to the ongoing HBM and CCM programs, including compliance issues.
3. Evaluate the knowledge, practices, and opinions of health workers, including community health workers, health center personnel, and district health staff.
4. Assess pharmaceutical management and management information systems.
5. Assess knowledge and practice of private sector providers, notably in the *comptoir pharmaceutiques* (medicine shops).

Record review
Key stakeholders, including implementing partner NGOs and the INMCP, were contacted to request copies of any data that had been collected or reports that had been written with relevance to the programs. The INMCP shared the HMIS for HBM malaria. All reports and data collected were reviewed by the assessment team to extract information on the effect and impact of the HBM Program. Registers and forms were also reviewed to assess consistency and gauge the size of the caseload.

Assessment of community's perceptions, and opinions, related to the ongoing HBM Program and the CCM program
Qualitative information was gathered during focus group discussions (FGDs) with three types of caretakers: mothers, grandmothers and fathers. All three groups had a child at home in their care between 6 months and 5 years of age. In addition, in-depth individual interviews (IDIs) were conducted with community leaders and traditional healers for the same areas. Criteria for participation in the FGDs were being a resident of the community and being responsible for a young child within the age group indicated. Community leaders and traditional healers were recommended to the assessment team by the health center staff.

Topics addressed during the FGDs included:

* Treatment seeking behavior, and changes in such behavior since the implementation of the HBM strategy
* Satisfaction with the services in the community and at public health facilities, as currently offered, and aspects of the service in need of improvement
* Adherence/compliance with recommended treatments and referrals
* Caretakers' knowledge of symptoms and signs of malaria and danger signs
* Outcome of referrals
* Challenges, opportunities and recommendations for the program

The breakdown of sites where information was collected and the services provided are shown in Figure 4.

Figure 4: Breakdown of collection sites and services provided

District	Health Center	HBM Services
Original endemic pilot sites		
Kirehe	2 sites: Kabuye, Bukora	PRIMO, ORS, zinc, amoxicillin
Kamonyi	Cyeru	PRIMO only
Nyanza	Cyaratsi	PRIMO only
Nyamasheke	Karambi	PRIMO only;
Newer endemic sites that began immediately with PRIMO		
Gasabo	Kinyinya	PRIMO only
Rwamagana	Rwamagana	PRIMO only
Newer non-endemic sites that use RDTs and PRIMO		
Gicumbi	2 sites: Rwesero, Rubaya	PRIMO & RDTs
Gakenke	2 sites: Mataba, Karambo	PRIMO & RDTs

* Kirehe recently introduced other services through community health workers including management of diarrhea and ARI

Community Health Worker assessment on case management and pharmaceutical management

In the six endemic districts, four health centers were randomly selected as part of the quantitative assessment. Two CHWs were randomly selected from each of the four health center catchment areas, totaling eight CHWs in each district sampled. Of the two CHWs in each HC catchment area, one CHW was randomly chosen from a location close to the HC and one from a location far away from the HC.

In the remaining two non-endemic districts where RDTs are being used (Gicumbi and Gakenke), only two health centers (those using RDTs) were included for each district. Thus, the community healthy workers were over-sampled to assure a sufficient comparison to the other districts. Ultimately, six CHWs were selected per health center, producing a sample of 12 CHWs per district for those two districts.

Standardized questionnaires were administered to selected CHWs, CHW supervisor at cell level (also operating as a CHW), HC staff (including the store manager and *titulaire*), and the pharmacy manager/pharmacist at the district pharmacy. In addition to questionnaires, direct observations were conducted of CHWs treating patients. Each CHW was observed managing three cases of children with fever at the closest HC, although only a single case per CHW was used in the analysis. Three observations were conducted to take into account any Hawthorne Effect.[6] It is assumed that the third observation will be the most representative of normal behavior. An exit interview was also conducted with the mother of the observed child after leaving the CHW.

Topics that were assessed were:

- Performance, knowledge through observation and interview, caretaker exit interviews
- Availability and use of key antimalarial medicines (and other medicines relevant to child health in Kirehe district, where integrated community case management is being implemented)
- State of the pharmaceutical management infrastructure
- Appropriateness of pharmaceutical stock management and record keeping

[6] The Hawthorne Effect refers to any changes in performance that are due to the fact of being observed: i.e., that those observed modify their behavior consciously or unconsciously because someone is watching.

Additionally, samples of antimalarial medicines were collected from the public and private sector for quality testing. The analysis of these samples is being coordinated by the INMCP and results will be summarized in a forthcoming report.

Interviews with supervisors at different levels were also conducted to determine the frequency of supervision visits, use of checklists, and lessons learned.

Investigation of private sector providers
In addition to public sector components of the assessment, staff at private sector outlets known as *comptoirs pharmaceutiques* were surveyed using a simulated client method as well as structured interviews. In the structured interviews, information was gathered on knowledge of symptoms and signs of severe malaria, availability of antimalarials, knowledge of standard treatment guidelines and dispensing practices, and advice given at point of sale. Antimalarial medicines were also purchased at each outlet visited for quality testing.

A simulated client encounter was conducted at each outlet to assess the sales practices of the counter staff. Data collectors, or a member of the community that had been sufficiently briefed, simulated a caretaker of a two year old child with a specific set of symptoms and followed a standard script. Caretakers were instructed to tell the providers that they had a, "Two year old child at home with fever for two days." If asked, and only if asked, they were to report that the child had not yet been given any medicines for this illness and had no other symptoms. Following the exchange with the provider, the simulated client reported back to the data collectors on what the provider asked the client in order to assess the case, the treatment that was recommended and/or sold, and any advice or information given by the provider.

Training and data collection
For the quantitative component of the assessment, eight data collection teams (one for each district) were organized. The teams consisted of four data collectors and a supervisor. Supervisors were from the INMCP, PTF and community health desk. Data collectors were divided into 2 groups: pharmacists recruited through the Rwandan Pharmacist's Association for the pharmaceutical component and nurses for the rest. Twenty-four (24) data collectors were trained for two days, including a review of questionnaires and role plays.

A pre-test was conducted in the district of Kicukiro in a district pharmacy, and in a health centre and with some CHWs. As a result of the pre-test, some minor changes were made to the questionnaires.

Each team spent approximately 14 days in each district, conducting quantitative data collection, including interviews at the health centers and with the CHWs, observations of three CHW encounters and exit interviews with caregivers. Supervisors were responsible for reviewing questionnaires at the end of the day, and ensuring necessary corrections.

For the qualitative component of the assessment, two qualitative data collection teams comprised of 6 data collectors each (3 men and 3 women), received a three-day training on qualitative research skills before beginning field work. Training included pretesting the moderator guides and translation from French into Kinyarwanda by one of the INMCP supervisors. Each team was accompanied by a supervisor who facilitated contacts with the HC and obtained permission for field work from local authorities. For each health center randomly selected for participation, a full day of data collection was carried out at the community level by one of the two qualitative data collection teams.

All field work was completed over a two-week period from July 14 to July 26, 2008, although the team had to prolong the data collection time for the RDT areas.

Data entry and analysis
Quantitative data were double entered (to ensure internal data validity) in CSPro software. Data were then cleaned and bivariate analysis was conducted in SPSS.

To verify the assumption that the third observation might differ from the first two, comparative analysis of the three observations was conducted, but did not show any particular pattern related to correct performance. As some observed cases were referred before completing the full set of case management tasks (e.g., treatment and counseling), the last observation that contained the specific action under study was chosen for analysis. For example, in the case of variables related to checking for "danger signs" and doing a "physical examination," the third (last) observation was used for analysis, as it was the entry point and all cases observed went through that "triage." If the third observation per CHW did not include treatment and counseling, the second observation was used (or the first if the second also did not include these actions). The observations selected for analysis were then linked with exit interview data with the caretaker for comparison of community health worker counseling actions and caretaker knowledge. In addition, the data set was also linked to the community health worker knowledge about their tasks.

Transcripts from the qualitative data collection were prepared based on notes taken during the FGDs and individual interviews. All FGDs were tape recorded[7] and the sessions later replayed by the interview teams to ensure the accuracy of the notes recorded in Kinyarwanda which were then translated into French. Processing of transcripts was conducted on a daily basis during the field work process. Analysis of the full set of FGDs and IDIs was carried out after all field work had been completed.

[7] All interviewers were instructed to obtain permission from participants before recording the FGD sessions.

FINDINGS

The findings shown in this section are relevant to CHW case management, pharmaceutical management at HC and CHW level, and community perception of the HBM strategy. Case management at all levels of the health system involves assessment, diagnosis, treatment and counseling. The following sections present results for the specific tasks that CHWs are expected to perform related to these areas, including the use of RDTs in 2 of the districts.

Assessment and Diagnosis—Danger Signs
The initial CHW task in assessment is the identification of danger signs that would indicate the need for immediate referral, particularly difficulty breathing, persistent vomiting, inability to eat or drink, and convulsions. Table 1 presents the results of the direct observations (practice) and the interview responses (knowledge) for danger signs. While CHWs focused relatively well on vomiting and inability to eat or drink, less than half checked for other dangers signs[8]. In addition, only 18% of CHWs checked for all five key signs during the assessment (convulsions, vomiting more than 3 times, inability to drink or eat, difficult breathing and unconscious).

Table 1: CHW knowledge and practice related to danger signs

Danger Signs	Knowledge (n=72)	Practice (n=69)
Convulsion	69%	43%
Difficult breathing	24%	45%
Vomiting more than 3 times	60%	74%
Unable to drink and eat	47%	57%
Unconscious	43%	43%
CHW that mentioned all key danger signs	8%	18%

Concerning knowledge about case management, the CHWs were asked to enumerate the different tasks related to malaria case management (see column 2 of Table 1 above). Overall, only 8% of CHWs mentioned all five danger signs. Data on CHW knowledge varies somewhat from data on CHW practices, with the percentage of CHWs who cited checking a danger sign being lower than those who were observed checking for it (with the exception of checking for convulsions). Among CHWs observed who did not check for a specific danger sign, half of them did mention that danger sign in the interview assessing CHW knowledge.[9] It should be noted that the list of danger signs to be checked is available on their job aid.

Assessment and Diagnosis—Physical examination for malaria
Once CHWs finish checking for danger signs and decide to continue the visit (i.e. no referral), they are supposed to carry out a physical examination. Of the CHWs observed in the series of tasks, 90% appropriately tried to assess fever by touching the child. However, in terms of signs of anemia, only 25% of children had their palms checked for pallor and 24% had their conjunctiva or mouth checked (see table 2).

[8] Even though anemia is one of the danger signs, this act is included in assessment of CHW performance under physical examination.
[9] Note of caution: the sample size is small.

Table 2: CHW performance related to physical examination

Physical Examination	Observation (n=69)
CHW tried to assess fever by touching the child	90%
CHW who assessed palms	25%
CHW checked conjunctiva or mouth	24%

Rapid Diagnostic Tests

The INMCP decided to adopt Optimal® as the RDT to be used by CHWs. This RDT uses monoclonal antibodies against the metabolic enzyme plasmodium lactate dehydrogenase (pLDH). These antibodies are classified in two groups: the ones specific for P. Falciparum and the others for P. Falciparum, P. Vivax, P. Ovale, and P. Malariae.

For the 24 CHWs who work in non-endemic areas, performance using RDTs was assessed through both interviews (knowledge) and observation (practice). The tasks assessed were drawn from the MoH's RDT job aid for CHWs. Nearly all (96%) of the CHWs had the job aid with them to use as a reference.

All 24 CHWs had the test kits and other tools needed to perform an RDT. In interviews, all CHWs mentioned they perform the RDT with children when they have fever. Generally speaking, knowledge and practice related to RDTs was high (see Table 3).

Table 3: CHW knowledge and practice related to RDTs

Task	Knowledge (n=24)	Practice (n=24)
Check expiration date	71%	63%
Put on gloves	100%	96%
Position kit horizontally	92%	100%
Write identification of person and date on kit	71%	96%
Put drop of buffer in first hole	95%	100%
Disinfect finger and use pipette correctly	96%	92%
Use the pipette correctly	96%	48%
Discard pipette in waste container	71%	78%
Put entire volume of blood in 1st hole	100%	95%
Use kit to insert it in the first hole for 10 minutes	100%	79%
Use pipette to stir and let stand one minute	80%	100%
Use dipstick in 2nd hole for 10 minutes	100%	87%
Take out stick and throw away remains of kit	96%	96%
Interpret test correctly	N/A	91%
Gave PRIMO if test positive	100%	100%
Gave PRIMO if test negative	N/A	25%
Gave PRIMO and referred to HC	92%	14%

Referrals

From a record review of referral forms from 72 CHWs, 92 children were referred to the HC during the last 3 months. Out of these referrals, for 64 (70%) the CHW received a counter-referral form from the HC. The main causes for referral were: diarrhea, difficult breathing, and skin rash.

Health center personnel are also supposed to be the referral link for the CHWs. The majority of HC staff (96%) interviewed mentioned receiving referrals from CHWs, and 86% of staff stated CHW referrals were pertinent. The major causes of referrals were cited as diarrhea, pneumonia, fever, and cough. Among the reasons cited by the supervisors for not referring the child was lack of money (93%), and lack of transport (89%).

Treatment and counseling

Treatment
Among the CHWs observed, 98% (n=72) asked about the child's age, and 97% gave the appropriate package of PRIMO for the age of the child.

From a record review of 402 cases of fever seen by the CHWs studied (randomly selected over the last six months across the eight districts sampled), all cases were correctly given an HBM blister of PRIMO and 92% were given the correct blister for age. Of the 402 cases, 242 (60%) were children in the age range of 6 to 36 months, who should receive the red blister. In this group, only 7/242 (3%) were inappropriately given the yellow blister. Of the 160 children in the age range of 36 to 59 months, who should receive the yellow blister, 24/160 (15%) inappropriately received the red blister. It is possible that this is due to errors in reporting. On the other hand, the mistake of giving yellow PRIMO to younger children and red to older ones was also detected during FGDs with community health workers in two of the districts sampled.

When interviewed all CHWs (n=72) stated that they administer the first dose of PRIMO under observation and the majority (83%) stated that they have a specific cup that they use for the administration.

The CHWs were observed to see if they followed appropriate dispensing practices. Eighty-six percent (86%) of CHWs correctly explained to the caretaker to crush the pills and mix them with water, and 91% correctly advised the caretaker when to administer the second and third doses. Fifty-seven percent (57%) of the CHWs asked the caretakers to supervise the child for 30 minutes in case of vomiting. Seventy-one percent (71%) of the CHWs advised the caretaker to finish the treatment and 54% mentioned that any left-over medicines should not be kept.

Counseling
Table 4 presents data on observed CHW counseling tasks. CHWs did well on messages related to taking the medications (dosage, administration), but only a little more than half counseled on not keeping any leftover medicines or observing the child for 30 minutes after giving medicine.

CHWs did not perform as well on messages related to when to return and, more importantly, caretaker knowledge was lower than the percentage of those that were given these messages.

Table 4: Observation of CHW related to counseling messages

Counseling	Practice (Observation) (n= 41)
Asked the child's age	98%
Appropriate PRIMO package for age	97%
Explained to crush the pills	86%
Advised caretakers to administer 2nd and 3rd dose	91%
Advised not to keep the medicine	54%
Advised caretaker to supervise the child for 30 min.	57%
Advised to bring back in case he/she gets worse	63%
Advised to bring back if other signs develop	56%
Advised to take to HC if not get better in 24 hrs	46%
Advised to take child to HC if still has fever	36%
Advised to take child to HC if has skin rash	21%

Data on counseling knowledge; whether they were observed providing counseling or not, was obtained for all 72 CHWs (see Table 5). The CHWs were asked about their knowledge of the various counseling tasks. CHWs did well on when to take the pills, but not as well on other counseling messages related to administering the treatment.

For counseling on when a child should be taken to the health center or back to the CHW, the most frequent response (74%) was, "If the child does not get better." Other messages were mentioned much less frequently. Overall, only a few CHWs were able to mention all of the different messages. Among the CHWs observed who did not perform the counseling messages, it appears that half of them knew about the different messages.

Table 5: CHW knowledge of counseling tasks (based on a full set of interviews)

Counseling	Knowledge interviews (n=72)
Administration of treatment	
First dose under the CHW supervision	100%
Tell the mother to crash the pills	48%
Give the pills every 8 hours	89%
Give another dose in case the child vomit	48%
Caretaker to finish the doses	50%
Medicine has no side effect	3%
Continue feed or breastfeed the child	18%
Reasons to take the child to the HC or to the CHWs	
Child does not get better	74%
Child does not get better within 24 h.	29%
Development of other signs	42%
Child still has fever after the 3 doses	29%
Child does get better after 3 doses	29%
Child has developed skin rush	18%
CHWs who mentioned all the different messages	7%

All of the CHWs (n= 72) mentioned that they visit the child at home after a few days to monitor their health and 58% mentioned that they want to make sure that the caretaker gives the full treatment to the child. Similar information was gathered during the qualitative sessions with the CHWs.

Caretaker knowledge of key messages after the consultation:
Based on 215 exit interviews, caretaker knowledge after the consultation was not high. Of the caretakers observed who received counseling that the child should be taken to the HC or the CHW if their condition worsened after taking the medicine, only 50% of caretakers could repeat the message in an exit interview. Similar results were found for those counseled on skin rash (40%), on what to do if child develops other signs (40%), on taking the child to the HC if he/she still has fever (35%) and on taking the child to the HC if there is no improvement in 24 hours (45%).

The caretakers were asked a series of questions related to their satisfaction with their interactions with the CHW during the encounter. Of the 215 caretakers interviewed, few were dissatisfied with the visit: less than 7% were dissatisfied with any one aspect (time spent, how the CHW talked, examination of child, what they learned, and the treatment received). In addition, about a quarter to one third were very satisfied with the time given to the visit, the way the CHW talked to them, the way the CHW examine the child, what the caretaker learned from the CHW, and the treatment that the child received.

Table 6: Caretaker satisfaction with CHW services

Evaluated action	Level of caretaker satisfaction (n=215)		
	Very satisfied	Satisfied	Not satisfied
Time given to the visit	27%	32%	4%
How the CHW talked	32%	67%	1%
The way the CHW examined the child	23%	73%	3%
What the caretaker learned from the CHW	25%	69%	6%
The treatment the child received	17%	76%	7%

Pharmaceutical management: Availability of medicines
Because a constant supply of medicines is essential for CHWs to manage their cases appropriately, pharmaceutical management was assessed at other levels of the system on which the CHWs depend, including the health center level and the district pharmacy. During the qualitative research, the CHWs mentioned that they wanted it to be easier for them to have a constant and reliable supply of medicines.

Data was collected from eight districts and included a sample of 8 district pharmacies, 28 HCs and 72 CHWs. Two districts were already implementing diagnosis of malaria with RDTs prior to treatment. The sample size is shown in Table 7.

Table 7: Sample size for pharmaceutical management section of assessment

District	Pharmacy	Health centers	CHWs
Gakenke	1	2	12
Gasabo	1	4	8
Gicumbi	1	2	12
Kamonyi	1	4	8
Kirehe	1	4	8
Nyamasheke	1	4	8
Nyanza	1	4	8
Rwamagana	1	4	8
Total	8	28	72

Data collection focused on key pharmaceutical management issues, including: availability of medicines, ordering procedures, inventory management, supervision and reporting processes at all levels, medicine storage conditions of the CHWs and infrastructure of the storage facilities at multiple levels, as well as the use of medicines by the CHWs.

Availability of medicines at all levels

A list of 20 antimalarial tracer medicines and supplies was used to assess availability at the time of the evaluation and the amount of time stock-outs of the tracer medicines and supplies had occurred over the previous six months (January through June 2008), as recorded in stock cards or other records. As mentioned previously, Kirehe district is different from other districts, as integrated community case management has been introduced in some areas and thus an additional three tracer medicines (amoxicillin, ORS and zinc) were added to the list to cover treatment of diarrhea and pneumonia for this district.

At the CHW level, the only medicine expected to be stocked is PRIMO blisters (the antimalarial used for HBM by the CHWs), with the addition of RDTs in the two districts where RDTs are being implemented (Gicumbi and Gakenke). In Kirehe District, where a broader spectrum of child illness is being handled by the CHWs, amoxicillin, ORS, and zinc should be available. At the health center level, it is expected that, in addition to PRIMO (reserved for HBM use), Coartem blisters, artemether injections, and quinine for management of severe malaria should be available. Some other antimalarials, not considered appropriate treatment, were included to assess whether complete phase-out had occurred. Table 8 illustrates the overall availability of Primo and RDTs in the facilities studied. The list of availability of the complete tracer list of medicines can be found in annex 1.

Table 8: Availability of PRIMO and RDTs at the time of survey, by level

Medicine	District Pharmacy (n=8)	Health Center (n=27)	CHW (n=71)
PRIMO red blisters	75%	87%	80% (n=70)[10]
PRIMO yellow blisters	88%	87% N=23	92%
RDTs (limited to 2 districts only Gicumbi and Gakenke)	50% N=2	100%* N=4	100%* n=24

[10] Data missing from 2 CHWs. In each of the tables of findings, the actual N for the result is presented as data from the full sample was not always available

While the availability of yellow PRIMO was good at the district pharmacy (88%) and health center levels (87%), red PRIMO was slightly less available (75%) especially at the district level.

Quantities of medicines and supplies in stock
The amount of key antimalarials in stock at different levels was assessed compared to average consumption. This measure gives an idea of whether facilities have sufficient stock or are overstocked. Overstocking of medicines, especially those that have short shelf lives and are heat sensitive (such as artemether/lumefantrine), is not recommended according to good storage practices of medicines. Table 9 shows the average number of months of PRIMO found at each level. Further data is show in annex 2 for Coartem blisters and artemether injection.

Table 9: Average number of months of available stock of PRIMO by level

	District Pharmacy (n=8)	**Health Center (n=27)**	**CHW (n=71)**
PRIMO red blisters / 6-35 months	0.3	3.7	1.2 (n=56)[11]
PRIMO yellow blisters / 3-5 years	0.6	11.1	2.1 (n=55)

There is no problem of overstocking, except at the health center level, where on average approximately a year's supply of yellow PRIMO is being stored in the health centers studied. Rather, there is a problem of under-stocking, which is problematic, as the stock levels do not allow for any margins or security stock for increased demand. The district store levels of PRIMO are much too low to assure uninterrupted distribution to health centers and the CHWs. A health center should have on hand at least one month's stock, plus one or two month's consumption as security stock. At the CHW level, only one to two months supply should be kept as protection from heat is more challenging.

Periods of stock-outs
The length of time of stock outs is a more robust indicator of availability as it provides information over a period of time, not just the point of the visit, and can indicate how well the distribution process and inventory management are functioning.

As seen in Table 10, the average time out-of-stock[12] was minimal for most antimalarials. Red PRIMO experienced slightly longer periods of stock outs at both district and health center level, which is also reflected at the CHWs' level. However, it was noted in the qualitative research that because the CHWs work as a team and if an individual has a stock-out, they report that they always know where to find another CHW with the necessary supplies.

[11] Data was not available to be able to calculate this result with all CHWs surveyed, hence the N is reduced
[12] calculated as the number of days out of stock for a medicine as a percentage of the number of days in 6 months multiplied by the number of facilities

Table 10: Average percent of time out of stock over a period of six months for tracer medicines and supplies

Tracer List medicine	District pharmacy (n=8)	Health center (n=27)	CHW (n=71)
PRIMO red blisters	6%	5% n=22	6%
PRIMO yellow blisters	4%	2% n=20	3%

Cost of medicines
The CHWs receive their stock of PRIMO at no cost and they then are supposed to charge a fee (100RWF) when it is dispensed to the caregiver. The reported fee varied at the time of the survey from 50 RWF (18% or 11/59) to 100 RWF (80% or 47/59), with one CHW (from the district of Nyanza) mentioning 200 RWF. The 11 CHWs mentioning 50 RWF came from four different districts: Gakenke, Kirehe, Nyanza and Rwamagana. Similar differences in pricing at different locations were also picked up during the FGDs with caretakers and CHWs. The advantage of the *mutuelle* was recognized, especially if there is a referral.

Pharmaceutical management by the CHWs

Ordering process of CHWs
Of the 72 CHWs interviewed, all submit orders to the nearest HC and get medicines themselves. Most CHWs (62/71 or 87%) walk to the HC to obtain the medicines. The remaining CHWs use either a bicycle or some other means of transportation. Just over a third of the CHWs (25/72 or 35%) determine the quantity of medicine to order, while the remainder (65%) have the quantity determined by HC staff. The process of calculating the quantity to order varied among CHWs. For those CHWs that responded to questions on how quantities of medicines were determined, 31/48 (65%) based calculations on past consumption from the registers or reports while the remainder use general experience or reported that the HC staff decided. Medicine orders were reported to be placed monthly for 31/72 (43%) of CHWs, or when needed with no regularity (50%). Very few CHWs reported placing orders on a bi-monthly basis (4/72 or 6%) and one CHW reported ordering on a weekly basis. It appears that the process and frequency of ordering varies from CHW to CHW with no standard process being followed and so it remains the responsibility of the CHWs and the HCs to ensure that there is adequate stock held at community level.

Inventory management by CHWs
Overall, the CHWs store medicines properly; 70/71 (99%) store medicines in a dry, clean place and 66/71 (93%) store medicines in a closed locked box -five CHWs stored their medicines in a box which did not have a padlock and so the box could not be locked. Another measure of inventory management is whether the existing stock corresponds to the records. The physical stock of red PRIMO corresponded to the CHW records in 83% (58/70) of cases and of yellow PRIMO in 80% (56/70). Observing whether there was any expired stock, it was found that 19% (14/71) of CHWs surveyed had some expired stock of red PRIMO and 11% (8/71) had expired stock of yellow PRIMO. Although the CHWs were not asked what they do with expired stock, it is expected that they are advised to give it to the supervisor during a visit or to the HC staff when going to order more medicine. Some CHWs mentioned this as a concern in the focus group discussions of the qualitative research.

Reporting of CHW pharmaceutical management
All but one of the 72 CHWs interviewed stated that reports on consumption and antimalarial stock availability are completed on a regular basis, with nearly all, (97%) mentioning the standard report developed by the NMCP. All CHWs submit reports to the appropriate HC on a monthly basis.

Pharmaceutical management: Health center and district pharmacies

Ordering process
All HC staff reported that they ordered PRIMO themselves from the district pharmacy, which is the standard "pull" process. However five HCs also mentioned that they also obtained supplies of PRIMO from the HBM program or from an NGO. Most HC staff reported that they travel to the HC by bike (54%) but some use a vehicle (33%).

Most of the 27 HCs (64%) reported ordering PRIMO on a monthly basis, although 11% ordered as needed; this frequency depends on the capacity to store and needs of the HC in the absence of a standard MoH recommendation. The order quantity in most HCs (82%) is reportedly based on a review of past consumption, using stock records or INMCP reports, which is the recommended practice.

District pharmacies order PRIMO less frequently (43% reporting once every 3 months [n=7]) from CAMERWA, although INMCP was also mentioned as a source of supply by one district and PSI by another. This is most probably as the district pharmacy staff do not differentiate between the different actors involved in the distribution chain as described in the background. About half of the district pharmacies reported that they based the quantity to order on consumption (57% [n=7]).

Distribution and inventory management
In most HCs (27/28 or 96%) and in most district pharmacies (86% or 6/7), the respondent reported that they had and used stock cards for stock management. Only one of the 28 HCs, and two of seven district pharmacies mentioned using a computer for inventory management. The correspondence between physical stock of PRIMO and the recorded balance on the stock card for all HCs and district pharmacies and for Primo is shown in Table 11. A complete table showing the findings for all medicine studied is found in annex 4.

Table 11: Correspondence between actual and recorded stock for PRIMO

Tracer List medicines	District pharmacy	Health center
PRIMO red blisters	83% n=6	75% n=26
PRIMO yellow blisters	83% n=7	79% n=27

The data shows that for some of the medicines under study (including PRIMO), the physical stock did not correspond to the recorded stock in many facilities. If record keeping is not accurate, it makes the task of ordering based on consumption more difficult.

Another measure of inventory management is the existence of expired stock as shown in Table 12. It is worrying to note that in about a quarter of all facilities, both at HC and district level, some expired stock of PRIMO was found, indicating that store management was not appropriate, and either the medicine had been overstocked or the stock was not rotated. A similar picture was found for the other medicines as shown in annex 5.

Table 12: Percentage of HC and district stores with expired stock

	District Pharmacy (n=8)	Health center (n=26)
PRIMO red blisters	29% (n=7)	38%
PRIMO yellow blisters	25%	23%

Infrastructure

Overall infrastructure at HCs and district pharmacies was good as shown in table 13. Security was in place in all facilities. Only 75% of the district pharmacies and 44% of the 27 HCs reported a consistent supply of electricity. Very few district pharmacies (12%) or HCs (18%) monitored the temperature of the storage space, but in most HCs (96%) and most district pharmacies (88%) the medicines were protected from direct sunlight and heat by curtains or other means, although only just over half of the district pharmacies (62%) and nearly all (93%) the HCs had ceiling boards. Temperature control is particularly important for areas where artemether/lumefantrine is stocked as it is more heat sensitive than most other medicines and has a shorter shelf life. Most district pharmacies (88%) and HCs (74%) had a functioning refrigerator, and the temperature was monitored in most facilities (75% of district pharmacies and 70% of HCs).

Table 13: Infrastructure indicators

Indicator	District pharmacy (n=8)	Health center (n=27)
Lockable doors and windows for storage area of medicines	100%	100%
Bars on windows for storage of medicines	88%	96%
Electricity available consistently	75%	44%
Palettes used to keep medicines off the floor	75%	55%
Shelves used for storing medicines	75%	100%
Ceiling board in place	62%	93%
Temperature of storage area of medicines recorded	12%	18%
Storage area protected from direct sun	88%	96%
Functioning fridge	88%	74%
Temperature on fridge is monitored and recorded	75%	70%
Functioning computer	62%	22%

Reporting of pharmaceutical management at the health center
Most HC staff (26/28) stated that they complete reports on consumption and stock levels of PRIMO to send to the district on a monthly basis. Similarly at district level, the pharmacies all reported sending reports on PRIMO levels and consumption to INMCP (with one pharmacy specifying also sending to the CAMERWA); but only every three months (6/8). A quick review of the reports provided to interviewers revealed mistakes in computing the needs for PRIMO.

Aspects of pharmaceutical management related to integrated CCM in Kirehe district

In Kirehe district, in addition to malaria, CHWs have recently been trained to also manage cases of diarrhea and ARI. The integrated management of more conditions than just malaria involves the wider health system and is less vertical than the malaria-only system. It is important to study what impact the integrated program has on how the CHWs manage their medicines and on the supply to the CHWs. However it was found that many of the CHWs had little, if any, experience managing cases other than malaria as they had not yet received stocks of other medicines and thus the new services had not yet been announced to the general population. For this reason some of the responses do not come from the full sample of CHWs in Kirehe district. A full assessment of the CCM program after more time of implementation would be advisable.

CHWs
For the sample of 8 CHWs managing cases of ARI and diarrhea in addition to malaria, the ordering process appeared to be the same for ORS, zinc, and amoxicillin as for PRIMO, from the heath center. The medicines were kept in the same way as PRIM; stock cards are used by half of the CHWs (4/8) while a report with a format similar to that for antimalarials was stated to be completed by 88% (7/8) CHWs. When asked about diagnosing pneumonia, all 7 CHWs that responded knew the correct frequency of respiration that indicates fast breathing and thus pneumonia. The price of a consultation was a standard 50 RWF amongst the 5 CHWs that responded (compared to the varying cost of those only treating malaria). As the medicines are not in the form of a pre-pack (like PRIMO is), aspects of dispensing were assessed. Most (6/7) of the CHWs stated that they gave the first dose under observation. A variety of types of packing were mentioned by the 8 CHWs: original pack/blister (3), plastic sachet (3) and in folded paper (2); most (6/8) of the CHWs stated they do not label the medicines. Monthly reporting of stock levels to the health centers as for PRIMO was reported by 7 of the 8 CHWs interviewed.

A record review of these cases was also attempted, but the numbers were quite small (10 cases each of diarrhea and ARI were reviewed). As mentioned above it appears that only a few CHWs have actually started treating cases, despite having received the training a few months prior to the survey as they had not yet received the necessary medicines. This was confirmed during the FGDs with caretakers in Kirehe, who were not aware that the CHWs had been prepared to treat a broader range of child illnesses in their area.

Of the 10 cases studied that reported diarrhea, all correctly received ORS, 85% (n=7) correctly received zinc and 83% (n=6) were correctly not given an antibiotic. Of 10 reported cases of pneumonia studied, 5 correctly received an antibiotic and the others were referred to the health center.

Although these few cases were managed appropriately, the size of the sample is too small to draw real conclusions about the use of medicines by the CHWs for cases of diarrhea and ARI and warrants further investigation to evaluate the practices of CHWs using an integrated approach after a longer period of implementation. A more indepth assessment of the new CCM program is currently planned for 2009.

Health center and district pharmacy
At health center and district pharmacy level, the way the other medicines are handled is almost the same as for PRIMO. This consistent system facilitates the supply system since there is no individual system for PRIMO and another for other medicines that might be used at the community level.

While the health centers state that they send a regular report on medicines stock levels and consumption to the district, the reporting system for the district pharmacy for other medicines no longer involves the malaria program and it is unclear how that works.

Quality of medicines
A total of 130 samples of antimalarial medicines were collected for quality testing from both the public and private sector. These samples are being analyzed at laboratories contacted by the INMCP and results will be summarized in a forthcoming report.

Private sector providers' knowledge and performance
While private sector providers are not seen as an official part of the HBM strategy, they do provide services to the population and have been part of a program of PSI and the INMCP to introduce appropriate malarial treatment with PRIMO. However it was apparent from the qualitative research that, in general, caregivers take their sick children first to the CHWs and not to the private sector, which would be a preferred source of care for older children and adults.

For this part of the assessment, we considered only the *comptoirs pharmaceutiques* in the private sector, because private pharmacies (*officines*) are found primarily in the big cities: Kigali and Huye. While medicine vendors exist in the informal private sector, it was found in the 2006 HBM assessment[13] they are very hard to localize and even more difficult to interview. As the *comptoirs pharmaceutiques* are the target of interventions to introduce artemether/lumefantrine (or PRIMO) to the private sector with PSI, they were selected as the target for the survey.

In total, 33 *comptoirs pharmaceutiques* were visited, on average 4 per district, the actual distribution is shown in table 14. This sample consisted of all the *comptoirs* existing in the districts under study, with the aim being that the data collectors should try to find 5 *comptoirs* per district as it was estimated that all districts have about 5 *comptoirs pharmaceutiques*, but in some districts there were less than 5, and so the total of operational *comptoirs* in the district was studied. This sampling did not take into account the recent accreditation program and the sampling frame was the list of *comptoirs* provided by the PTF.

Table 14: Distribution of *comptoirs pharmaceutiques* in the sample

District	***Number of comptoirs surveyed***	***% of sample***
Gakenke	4	12%
Gasabo	5	15%
Gicumbi	4	12%
Kamonyi	4	12%
Kirehe	3	9%
Nyamasheke	3	9%
Nyanza	5	15%
Rwamagana	5	15%
Total	33	

[13] Barat et al 2006 external evaluation of the pilot phase of Home-based management of malaria (HBM) program in Rwanda.

From the sample of *comptoirs* studied, the majority 27/30 (90%) were already covered by the Rwanda ACT private subsidy program implemented by PSI (i.e., the staff had been trained and had supplies of PRIMO).

The majority 18/33 (55%) of the *comptoirs* were found to be less than 1 km from a health center, which is not a surprising finding because private medicine outlets tend to be located in busy centers rather than in isolated locations. Of the 33 *comptoirs pharmaceutiques*, all were staffed by people who had received formal clinical training; the majority of whom were nurses or nurse assistants (88%), three (9%) were medical assistants and one (3%) was an auxiliary.

Knowledge of symptoms and treatments
For a condition as common and potentially serious as malaria, it is expected that around 80-90% of staff at *comptoirs pharmaceutiques* would recognize the differentiating symptoms, although no national standard for this indicator exists. All counter staff interviewed correctly stated fever as a symptom associated with simple malaria, although a few incorrectly mentioned fever with convulsions (5/33 or 15%), lethargy (15%) or refusing to eat (24%), which are symptoms of severe malaria.

The majority (29/33 or 88%) of counter staff correctly said the recommended treatment for simple malaria in children was artemether-lufemantrine (PRIMO or Coartem being the names mentioned). However, a scenario of a case of malaria with digestive problems (that should require treatment with first artemether injection and then artemether-lufemantrine orally) posed some problem to the counter staff, as only 11 (33%) correctly mentioned they would treat it with artemether-lufemantrine and many (12/33 or 36%) said either they didn't know or they would refer the case. However, most counter staff (70%) said that clients often demand a particular medicine for malaria, with the antimalarials most frequently requested being quinine and PRIMO (artemether-lufemantrine), but also including Sulfadoxine-Pyrimethamine (Fanisdar) and amodiaquine.

When asked for the symptoms of a severe case of malaria, 67% (22/33) correctly mentioned fever and convulsions. For cases of severe malaria in children, 30% (10/33) correctly stated the recommended treatment was quinine, but most 64% (21/33) said they would advise how to reduce the fever and refer the child to hospital. When asked about prevention of malaria in children, the majority (97%) of counter staff mentioned the use of ITNs. However, it is important to note that as shown later in this section, only 15% of outlets stocked ITNs, even though distribution of ITNs in the private sector is operational and implemented by PSI. The low availability of ITNs could be due to not all private outlets being listed as outlets for ITN sales

Referrals
The majority of counter assistants (94% or 30/32) stated that they referred children to health facilities. Most (87%) mentioned danger signs or non-response to treatment as the motive for referral. The health center was considered to be the first point of referral for most (68% or 21/31) counter staff, with the remainder mentioning the hospital. None of the respondents mentioned a formal system of written referral notes.

Knowledge of dosing
The majority of respondents (91% or 29/32) correctly stated the appropriate dosing for PRIMO as six tablets. All knew the correct frequency of administration is two tablets per day for three days, although none specified the complexity of the dosing schedule of the second dose being 8 hours after the first.

Dispensing practices
Counter staff were asked if a prescription was required to dispense Coartem/PRIMO in order to assess the current practice. A ministerial directive was issued in July 2008 to this effect, but at the time of the assessment, the counter personnel were supposed to treat all presumed cases with PRIMO and accordingly only 25% of counter staff said that a prescription was required to dispense Coartem/PRIMO. Counter staff were also interviewed about labeling and other information about medicines that should be explained to the caregiver when dispensing medicines. Most respondents (91%) correctly mentioned that the dose or how to take the medicine should be included on the label, and 85% appropriately stated that the dose (when and how to take the medicine) should also be explained verbally to the caregiver. During the qualitative research both CHWs and caretakers reported that the instructions on the PRIMO package were easy to understand. Other findings on dispensing practices and counseling on medicines are shown in Annex 6.

Knowledge of other advice to be given to the caregivers was low. About half (55%) of the respondents mentioned that they would give advice on what to do if the condition did not improve, 40% mentioned advice to purchase an ITN, 33% advice on hygiene, and 27% mentioned advice on feeding.

Availability of medicines in *comptoirs pharmaceutiques*
Counter staff were asked what medicines and supplies they had in stock using a tracer list of nine key antimalarial medicines and ITNs. They were also asked if they stocked any other antimalarials not included on the tracer list.

Table 15: Availability of tracer medicines and supplies at time of survey in private pharmacies

Medicines and supplies	***Comptoir pharmaceutiques*** (n=33)
PRIMO blisters	64%
Quinine injections	0 (0/31)[14]
Quinine tablets	35% (11/31)
ITNs	15%
SP tablets	3%

As shown in table 15, only 64% of *comptoirs* had PRIMO available at the time of the interview. None of the *comptoirs pharmaceutiques* stated that they had artesunate, amodiaquine, chloroquine, coarinate or coartem tablets in stock, although this could not be confirmed visually. In addition to the nine antimalarials on the tracer list, staff at 11 *comptoirs* mentioned they had quinine syrup in stock.

The availability of PRIMO varied by district, possibly due to the roll-out of the PSI intervention, as shown in Table 16. It should be noted that nearly all the outlets studied had already been targeted by the ACT subsidy program in the private sector (implemented by PSI) as all sampled districts had been included in the training of staff in the private outlets.

[14] It was not possible to use the full sample of 33 *comptoirs* for this indicator because data was only available for 31 *comptoirs*.

Table 16: Availability of PRIMO in *comptoirs pharmaceutiques* by district

District	Availability
Gakenke	75% (n=4)
Gasabo	60% (n=5)
Gicumbi	50% (n=4)
Kamonyi	75% (n=4)
Kirehe	67% (n=3)
Nyamasheke	33% (n=3)
Nyanza	100% (n=5)
Rwamagana	40% (n=5)
Total	64% (n=33)

The price of PRIMO was almost standard at 300 RWF in 95% (20/21) of the *comptoirs* which is the correct price for the sale at an affiliated outlet according to the ACT subsidy program, with only one selling PRIMO at 500 RWF. It is important to compare this to the price of PRIMO at the CHWs, where it is sold at 50 RWF or 100RWF.

Just under half (15/32 or 47%) of the *comptoirs pharmaceutiques* had visual aids related to malaria, although not all (only 6/25 or 24%) were clearly visible for the counter staff and only 15% mentioned management of severe malaria.

Actual sales practices

In addition to interviews, simulated client scenarios were conducted in 31 of the *comptoirs pharmaceutiques*.

Simulated purchases were conducted by surrogate caregivers, data collectors, a driver, or a person from the community. Each simulated customer was properly briefed on the scenario of a "two year old child with symptoms of mild fever for two days, who had taken no other medication," and were to ask at the *comptoir pharmaceutique* what treatment they should give. Upon leaving the outlets, the data collector noted the name of the medicines sold, the dose recommendation, and all advice given or extracted the information from the person conducting the simulation.

About a third (34% where n=31) of the simulated caregivers were informed by the counter assistant of the illness their child had. Few attendants asked for additional information on the history of the child's illness (14%, n=28), and 38% (17/21) researched whether there were any danger signs that may require immediate referral rather than treatment.

In 45 % (n=31) of encounters, an antimalarial was sold to the simulated client: only 7/31 (23%) were correctly sold PRIMO and 23% of cases were sold quinine. The remaining 55% of cases were sold Paracetamol (antipyretic/analgesic), with Flagyl (antibiotic) being sold to one case, chlorpheniramine (antihistamine) to one case and Novalgin to another Of the seven cases that were correctly sold PRIMO, only two were given the correct dose information (1 tablet twice a day for 3 days). For the medicines that were provided to each case, 29% (9/31) of the counter staff provided instructions on how to take the medicines and 10% (3/31) provided written instructions on the label. Even though 17/31 (55%) cases were not sold an antimalarial, only 11% (3/28) of all the simulated cases were advised to go to a health facility.

Little additional information was provided by the attendant to the simulated caregiver, as shown in Table 17.

Table 17: Other information provided to the surrogate client by the sales attendant

Other information provided	Percent given
Gave advice on what to do if the child got worse	29% (n=15)
Gave nutritional advice	15% (n=15)
Recommended the use of an ITN	0% (n=17)

Supervision of CHWs

In each of the 28 health centers (HC) in the 8 districts participating in the survey, a HC staff member responsible for supervising CHWs was asked about the supervision process. Of the 979 villages served by the 26 health centers providing data in the assessment, 81% have two CHWs. Of the 28 staff members interviewed, 89% supervise CHWs involved in HBM, 71% collected the report that the CHWs share with the HC, and 43% delivered medicines (PRIMO) to the CHWs they supervise. However it should be noted that 100% of the CHWs interviewed reported that they seek medicines themselves at HCs. Among those staff members supervising CHWs, when probed about their specific supervisory tasks, the majority mentioned the following: fill out the supervision checklist (*la grille*), troubleshoot problems, and advise the CHWs on any concerns they have. Table 18 presents the results on supervision tasks.

Table 18: Supervision tasks undertaken by health center staff

Supervision	Percentage (n = 28)
Supervise CHWs	89%
Collect reports from CHWs	71%
Deliver medicines to CHWs	43%

Sixty percent of CHW supervisors reported that they have a checklist for supervision (see annex 7). All supervisors reported preparing a report from their visits, but only 68% of supervisors were able to show a report to the interviewer. Although supervision is supposed to be monthly, supervisors reported an overall execution rate of only 36% (actual visits as a percent of planned visits). Supervisors most commonly cited the following reasons for this low execution level: other priorities, not enough time, and no fuel.

From the CHW point of view, 41/72 (57%) reported receiving a supervisory visit in the previous three months and 43% had received a visit within the last month. However, 33% (n=24) of CHWs stated they had never received a supervision visit, including CHWs from all 8 districts, but with most (7) coming from Gasabo. Of the 41 CHWs that said they did receive supervisory visits, 90% reported that HC staff conducted the visits and 34/41 (83%) said they received comments and feedback during the supervisory visits. Less than half the CHWs (17/41 or 41%) reported that the supervision visits focused on aspects of medicine storage and use.

Supervision at the health center and district pharmacy

Most HC staff reported having received a supervisory visit in the last month (61%, where n=28) and another 18% in the last 3 months. Most of these visits were by staff from the district (20/28) and some reported receiving visits from the central level MoH (4/28), with the majority 93% (n=27) receiving immediate feedback. The content of the visits seems to vary with only 10/28 HC staff reporting that the supervisors looked at aspects of medicine management.

Supervision at district pharmacy level is even more varied, with 43% (3/7) of pharmacy staff reporting they received a visit last month, 43% stating they received a visit less than 3 months ago and 14% (1/7) stating the visit was less than 6 months ago. The majority of respondents (5/8 or 62%) mentioned that these visits were carried out by the INMCP with few others mentioning MSH (1/8), NGO (2/8) and central level MoH (1/8), which although

not specified could be the INMCP or the Pharmacy Task Force. All pharmacy staff reported that supervisors gave feedback.

Community perceptions and opinions of the HBM Program

Caretakers—Satisfaction with the CHWs
In all areas sampled, caretakers know that the CHWs are there to treat malaria and do not hesitate to take their children for treatment at any time of the day or night. Almost all had brought a child to the CHW for care at one time or another. They accept when the CHW refers a child to the HC for treatment, understanding that the CHW has been trained to recognize when a child needs help that is beyond his/her capabilities. A number of mothers said that when their child was referred for care, the CHW accompanied them to the HC. Many noted that the CHWs visited them in their homes to check on their children after receiving treatment. Others said that they were a good source of advice on how to care for children and prevent illness. Across the board, communities appear to be very satisfied with the services offered by the CHW.

In areas that offer RDTs, parents understand the importance of taking their child to the HC if there is a negative test result and accept this as a regular service of the CHW. Some mothers said that they liked the test because it was “sure” and you got the results right away. In one area mothers described being instructed to refuse a test if they see that the package isn’t sealed.

Recognition of danger signs (listlessness; inability to eat, drink or breastfeed; high fever; vomiting everything; and convulsions) was extremely high among almost all of the groups interviewed. Many had learned about danger signs from a local CHW or HC staff. All of the groups agreed that it was possible to prevent many illnesses by sleeping under a bed net, closing windows early in the evening, boiling or purifying drinking water and keeping the areas surrounding the house free of brush, shrubs and stagnant water. Some described hand washing before feeding a child. The majority of people interviewed said that they slept under a bednet on a regular basis, although several admitted that they found sleeping under a net uncomfortably hot and used it only when the weather was cool.

Caretakers—Seeking treatment and compliance
Usually the Community Health Worker (CHW) and Health Center (HC) are caretakers’ preferred sources for treatment when a child is ill, although communities located far from the health center will also use traditional healers, who typically do not provide western medicine as part of their practice, on a regular basis for certain types of fever, diarrhea and other illnesses, particularly poisoning.

In some areas, regardless of symptoms and the presence of fever, when a child is sick, caretakers have been instructed by community leaders to go first to the CHW for an initial assessment and to obtain a referral slip for the local HC. In other communities, caretakers said that for ordinary fever they would go immediately to the CHW, but if the fever was high they would go straight to the HC. Other situations, such as fever with convulsions, fever with inability to eat, fever with vomiting, and fever with bloody diarrhea are cases where most caretakers said they would go directly to the health center for care. Caretakers in several communities talked about receiving a piece of paper from the HC that they returned to the CHW following a referral.

Caretakers indicated that normally it is not difficult to get the treatment that they want for their children when they are ill. Because of the CHWs and *mutuelle* system communities report that medicine has become reasonably priced and there are no longer surprises in treatment costs if the child needs to be referred to the HC. Prices for PRIMO through the CHWs were reported by caretakers in different areas to be between 50 RWF and 100 RWF.

For those belonging to the *mutuelle*, treatment was described to be between 200 and 300 RWF at the HC.

Almost all interviewees indicated that they would always complete a full course of treatment and give it exactly as they were instructed since otherwise, “the child could get worse or die.” One grandmother’s reflection on whether treatment should always be finished was “medicine isn’t expensive but that isn’t a reason to waste it.” A number of respondents said that “only ignorant parents” would stop giving medicine unless they had been specifically instructed by someone at the HC. It merits noting, however, although they represented a small minority of the people interviewed, some mothers said they would stop giving medicine if the child resumed playing and appeared to be better.

Although not everyone recognized the brand name PRIMO, they did recognize the signature red and yellow packaging. Caretakers say that it is easy to use and children take it without any problem since the taste is pleasant. There are no side effects, and many say that “it cures children quickly.” Some said that an additional advantage of the medicine is that it increases the child’s appetite. Caretakers in the districts sampled that were part of the original HBM program and familiar with the side effects and difficulties with administering AQ/SP to young children were particularly outspoken about their satisfaction with PRIMO.

In some areas where RDTs are offered and the child tests negatively for malaria, the CHW does not ask for any payment and the child is referred to the HC where the appropriate payment is made. In other instances caretakers described paying 100 RWF to the CHW and then another 100 RWF at the HC for treatment “since the program collaborates with the *mutuelle*.

Caretakers in almost all areas recommended that the CHWs be trained and equipped to handle cough, diarrhea, intestinal worms and flu, in addition to malaria. In areas in Kirehe where the package of services being offered by the CHWs has recently been broadened to include diarrhea and acute respiratory infection, none of the caretakers (mothers, fathers, grandmothers) interviewed were aware of the new services offered.

Community leaders

Community leaders are enormously satisfied with the CHW program and report that the communities they serve are too. As one community leader put it, “Although the community doesn’t do anything in particular for them, when there is a meeting that lasts 3 hours and the population stays until it’s finished, it’s an indication that people are satisfied with the program.” Some observed that because of the CHW and *mutuelle* programs, they thought that deaths due to illness among young children had dropped in their areas compared to previous years. Leaders said that the price is right, the medicines are good and it reduces the distance families need to travel to get care.

When asked about program activities, many community leaders began by describing how the CHW candidates were selected, the election process in general, and how the CHW services had been announced to the population. As one leader said, “It’s a good way of electing them since there’s transparency when it’s done this way.”

According to most community leaders, the CHWs are often involved in a broad range of activities with health center staff. In many areas, in addition to their HBM work, they help to rally communities to participate in health activities such as immunizations and neighborhood clean up work. In other communities CHW responsibilities include child weighing and referring pregnant women to the HC for services. In still other areas they do home visits to talk with household members about family planning and HIV/AIDS. Often they are called upon to speak at community meetings on health topics they learned about during their trainings or share training information with the community leader who then relays it to the population. Many community leaders say that the CHWs and HC staff are in regular contact and may see each other as often as four times a week. Still others describe monthly

meetings to turn in reports and receive training as the regular points of contact.

Similar to the suggestions made by caretakers, community leaders would like the CHWs to be able to treat a wider range of illnesses including diarrhea, intestinal worms and respiratory infections. The same request was made by community leaders and caretakers in the 2006 assessment. One community leader also indicated that it would be good if the CHWs could help with programs for tuberculosis. All of the community leaders interviewed suggested that the CHWs deserved and should get a bonus to keep them motivated to do the work they are doing. In Karambo, the community leader recommended that their CHWs be equipped with more gloves for when they do RDTs since he had been told by the CHWs that they were in short supply.

Community health workers—Knowledge and beliefs
Similar to caretakers, CHWs point out malaria, diarrhea, vomiting and pneumonia as common childhood illnesses in their areas. Many illnesses, they say, can be prevented by sleeping under a bednet, shutting doors and windows early in the evening, basic hygiene and rendering drinking water potable through boiling or using *Sur Eau "*a chlorinated water disinfectant product". Although they acknowledge learning a great deal during trainings, some said that, "We use common sense (in our work) since we are also parents that have brought life into the world and have seen a lot of things."

The CHWs report that when a child was ill in the past, some people would go to the HC for care even though it was a long distance away. Many would also go to traditional healers and pharmacies. There were also some that would "stay at home and not do anything since they had no money." Since the beginning of the CHW program many believe that there are fewer delays in getting appropriate treatment for young children.

Community health workers—Routine activities in the community
CHWs described the election process for becoming a volunteer with pride. As one CHW put it, "I was chosen by the population for my integrity and so I must do the work and do it well because of the trust (the population has in me)." Another CHW said that they really liked being called *muganga* (nurse) by her neighbors and welcomed the opportunity provided by the program to give to the community. According to the CHWs, criteria for selection included not only integrity, but also literacy and love of children. Some also added that they needed to have a clean house since medicine and materials had to be stored in their homes.

All of the CHWs interviewed agreed that their work is voluntary. Many CHWs have regular activities with the HC that go beyond treating young children with malaria and referrals. Baby weighing, immunizations and community hygiene activities are other common activities. Some said that they are involved with their work as the area CHW at least four days a week; although there were some respondents who had not yet received any children for malaria. For those that do receive children for malaria on a regular basis, the CHWs report that there are times when they might receive as many as three children in a day, while at other times they would see none. One CHW said that it had been more than two weeks since he had received any children for treatment. Another CHW expressed concern about the growing workload saying, "During the week we have only one day to take care of our homes. The other days we are involved in our work as volunteer health agents."

All of the CHWs described asking the mother about symptoms and looking for danger signs with any child brought to them for treatment. They fill out registers and forms for every child that is brought to them for care. Some described how they normally have the child take the first dose for treatment in their presence and how they observe the child for 30 minutes to see if there is vomiting or not. Most said they advised parents to give all of the medicine provided even if the child appeared to be better. Some CHWs offer caretakers advice on

feeding the sick child. Although referrals to the HC are a regular part of their work and problems appear to be limited, some report difficulties with compliance for their areas.

For those districts that offer RDTs, CHWs reported that malaria treatment is given only when there is a positive test. Cases that test positively but where other symptoms are present, such as cough or diarrhea, are given the standard treatment for malaria and are also referred. All negative cases are referred and the CHWs receive a "contra-reference" from the HC through the caretaker so that follow up can be provided, as needed.

Some CHWs say that the most difficult part of their work is advising parents on how to care for their children since, "It takes time to go to the households and sometimes the houses are far away." In other areas, turning in reports since it required finding money for transport were identified as problems. Others say, "It isn't hard and we like to do it because the local authorities support us." Testing blood, doing reports, consulting the *fiche des normes* and advising parents are described by some to be among the easier tasks

Other illnesses that CHWs report wanting to treat include intestinal worms, respiratory infections, coughs, vomiting and diarrhea. CHWs say that caretakers are coming to them more regularly for treatment of young children when they are ill and fewer now go to pharmacies or to traditional healers for care.

Many traditional healers reported to be interested in becoming more involved with the program and treating children along side the CHWs. In several instances the CHW for the area was also a traditional healer. Traditional healers also recommended that the CHWs receive additional training for treating young children suffering from coughs, intestinal worms and pneumonia. On the other hand, as one traditional healer who was also the CHW for her area put it, "We could do more, but it would be tiring."

Community health workers—Perception and knowledge about PRIMO and RDTs
When it is determined that a child needs treatment for malaria, CHWs described the process they followed for giving PRIMO Red and PRIMO Yellow. CHWs in one area said that it depended on age but also on the weight of the child. Several indicated that the medicine is very easy to give and that all the instructions are described on the package. Without exception, CHWs say that PRIMO is well accepted by the community. It is affordable, easy to get, children like the taste, and there are no side effects. It cures rapidly and, in some instances, parents report that it stimulates the child's appetite. However, in two of the areas sampled, the group of CHWs had the ages for treatment reversed, stating that PRIMO Yellow was for children between 6 and 36 months and PRIMO Red was for children aged 3 to 5 years (Kinyinya, Bukora).

The first dose of PRIMO is normally given in the presence of the CHW. Some described purchasing *Sur Eau* for 200 RWF out of their own pocket to ensure that the children were offered potable water with their treatment. Many keep potable water in small Jeri cans in their homes and use their own cups and spoons to administer treatment. In one area the CHWs say that because of *barishishanya* (local trust) they often recommend that caretakers come to their house with their own goblets ("well washed") and their own water for the first dose, although they are also welcome to use what they have. For subsequent doses, some CHWs will visit the sick children at home to ensure that the treatment is being given as indicated. Other CHWs describe following up with caretakers to check on the child and will verify whether the medicine is being correctly given by asking to look at the package and counting the number of tablets remaining.

In areas where RDTs are offered some CHWs said that they first looked at the expiration date on the package before opening it. Many described in detail the process of putting on gloves, cleaning the child's finger with a small piece of cotton and then pricking the child's finger with a lancet to get blood, "The way it is instructed in the norms." They then described waiting 10 minutes to read the results. "If the result is negative you explain to the parents

that the child might have another illness other than malaria that you can't treat and that they need to go to the HC." Most CHWs report that the parents follow their advice. They say that they know this since, "They live in our villages and we see them every day."

CHW supply stock-outs appear to be rare, although in one district CHWs were alerted to the fact that their supply of PRIMO would be expired by the end of the following month and that they were low on RDTs. As mentioned earlier, gloves were in short supply in some areas providing RDTs.

In areas of Kirehe, where, in addition to malaria, the CHWs have been recently trained and equipped to provide treatment for acute respiratory infections (ARI), diarrhea and nutrition counseling, it appears that communities are not yet fully aware of the new services. As mentioned previously, an assessment of this more comprehensive community based treatment model is expected to take place in early 2009.

Community health workers—Sources of information
CHWs report that people in the community like to go to them and the HC nurses for advice on caring for children. They say it is because they have been trained and that they are trusted. Some observed that there were posters at the HC on child care and some recalled hearing programs on the radio. Many said that the instructions included in the packaging for PRIMO and the RDTs were very helpful. Some said that they had seen information on danger signs and sick children. Others said they had books on tuberculosis as well as material on why tablets were as effective as injections for treating illness.

The participant manual that the CHWs received during training is clearly the most important source of information on child health for most of the volunteers. Several CHWs said that they used the participant manual a lot. As one woman explained, "When we're consulting someone we look at it from time to time (to make sure we don't) forget something, and people believe in what we do since they see that we're not making anything up."

Community health workers—Support from health personnel
In all of the areas sampled, the CHWs described some kind of regular communication with the HC staff. The most regular contacts are those connected with the vaccination program, weighing children, *umuganda* (community work), turning in reports or getting supplies, and monthly meetings at the HC. In most districts, supervision with the CHWs at the community level does occur although in some areas volunteers report that it has been between three to five months since they were last visited.

SUMMARY OF FINDINGS AND CONCLUSION

This assessment conducted after the recent introduction of a new treatment regimen (PRIMO) sought to answer a series of questions listed below. This section seeks to respond to these questions.

1. Are community health workers and private sector counter assistants performing according to standards (complete assessment, correct diagnosis, appropriate referrals, counseling and treatment)?
2. Is it feasible (proper performance and acceptability) to use RDTs at the community level?
3. What are the factors that facilitate (or hamper) the performance of community health workers and private sector counter assistants? How do communities view the HBM program and the services being provided by the CHWs?
4. Are caretakers compliant with treatment?
5. What are the factors that keep the caretakers from seeking prompt treatment for their children?
6. What lessons can be learned from the implementation and initial scale up of PRIMO at community level that will strengthen community worker performance and further scale-up?

This last question will be addressed in the recommendations section.

Are community health workers and counter assistants performing according to standards (complete assessment, correct diagnosis, appropriate referrals, counseling and treatment)?

Community health workers
The ideal provider behavior in the HBM program would be CHWs who correctly diagnose, treat and refer children who exhibit signs and symptoms of malaria within 24 hours of the onset of symptoms. The results from this assessment indicate that CHWs perform certain aspects of HBM very well and others need improvement. In general, CHWs are performing well using the recently introduced PRIMO and contributing to reduced malaria burdens on their communities.

Performed well:
- Checking for the existence of fever (condition *sine qua non* to give PRIMO), by touching the child or listening to the caretaker (according to the MOH standard).
- Gave correct treatment in the case of fever.
- Gave the correct color blister of PRIMO for age of child for most children.
- Available around the clock and provide prompt treatment for children with fever.
- The references are managed pretty well.

Needs improvement:
- Checking systematically for all danger signs – only 18% checked for all danger signs in the patient encounters observed.
- Checking for anemia – only 25% and 24% searched for pallor in the conjunctiva or palms.
- While counseling messages are provided, they are not systematic, and mothers who were given advice or information do not always walk away with a clear understanding of the intended message.

Private sector Counter Assistants

The Counter assistant is the frontline in the case management in the private sector, and as such they are supposed to be able to handle the different aspects of the case management (danger signs, diagnosis, treatment and counseling)

Performed well:

- Knew that fever was a key sign of malaria
- Knew the correct dose for Primo

Needs improvement:

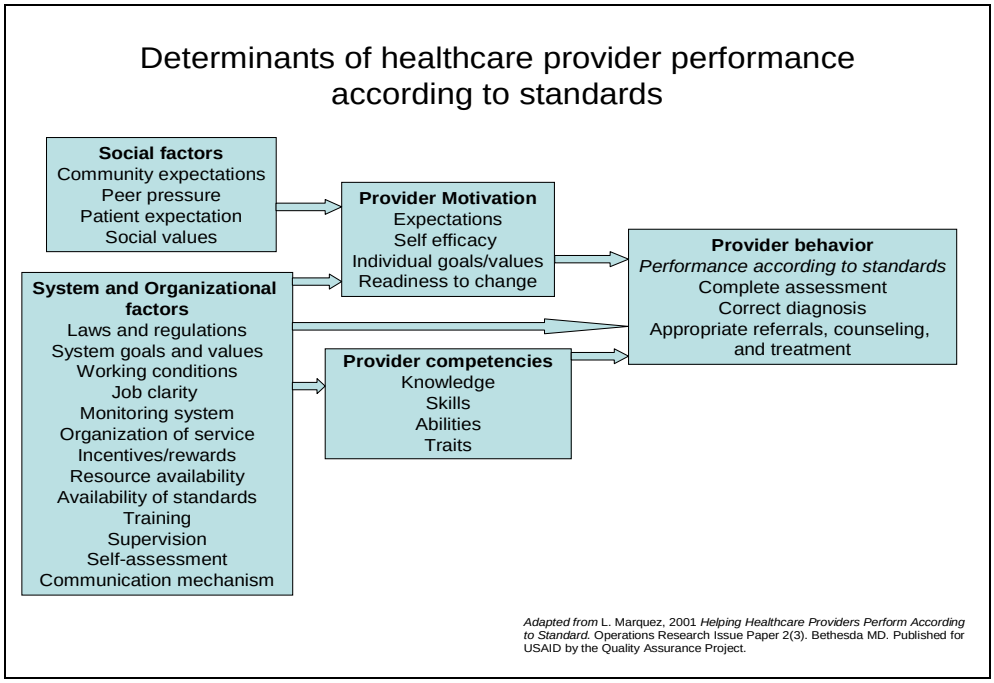
- Although knowledge of appropriate management of malaria is high, dispensing/prescribing practices often do not follow the standard guidelines for treating with PRIMO for children with fever
- Counseling for the caretaker on dose administration as well as advice on what to do if the child does not improve and prevention of malaria.

Is it feasible (proper performance and acceptability) to use RDTs at the community level?

The CHWs' knowledge and use of RDTs is quite good. However, some major steps were problematic. Practice in use of the pipette was poor, although knowledge was quite good. This step is crucial for the accuracy of the test and should be looked into very carefully. In addition, RDT use is well perceived by the community. Some mothers said that they liked the test because it was "Sure," and, "You get the results right away." It is worth noting here that in some areas caretakers interviewed for the 2006 assessment had indicated interest in having the CHWs do tests or examinations before dispensing medicine. However, some CHWs were observed giving PRIMO even in the case of a negative RDT which may indicate pressure from the community to get "something" for their condition.

What are the factors that facilitate (or hamper) the performance of community health workers and private sector counter assistants?

Figure 2 in this report (copied below) presents a framework of determinants of healthcare provider behavior. This assessment collected evidence on many of these determinants. We will discuss the social factors, system and organizational factors, provider motivation, and provider competencies that influence provider (CHW and counter assistants) behavior. We also reply to the question of "How do communities view the HBM program and the services being provided by the CHWs?" which is included under the social factors.



Community health workers—Social factors
The CHW's contribution to their community is very well received, and communities appear to be very satisfied with the services offered by the CHW. They are especially pleased with the "new" medicine being provided which caretakers say is affordable, effective, has no apparent side effects, and easy to administer to the child since "it tastes good." As previously mentioned, caretaker satisfaction with PRIMO in those HBM districts with earlier experience with AQ/SP was particularly important to those interviewed. In areas that offer RDTs, parents understand the importance of taking their child to the HC if there is a negative test result and accept this as a regular service of the CHW.

Community health workers—System and organizational factors
Communication between CHWs and HC seems good, at least with respect to referrals; CHWs get feedback about children they refer and HC staff perceive that the referrals CHWs are making are appropriate.

Supervision, in terms of the number of visits conducted and the quality, is weak. Regular supervision visits although planned are not being implemented. Although contact between HC staff and the CHWs for other activities such as immunizations, child weighing, turning in reports, community hygiene activities, etc. may occur on a regular basis, it cannot replace quality supervision.

Also, roles and expectations for the supervisory process, both for the supervisor and the CHW are not very clear. The supervisory checklist does not emphasize quality of case management. On the other hand, written treatment standards are readily available; each CHW interviewed had a job aid and therefore knew what was expected of them.

Constant availability of medicines and supplies—especially PRIMO— is a key factor for success in HBM. Availability of PRIMO was found to be inconsistent especially at the district pharmacy level. Across all levels, there was not enough stock on hand of PRIMO and stock outs had been experienced. This situation could be due to poor inventory management as well as incorrect ordering procedures. Although most respondents said their orders were based on consumption it is unclear exactly how they are calculated. The ordering process for medicine at the level of the CHWs seems to be monthly, but it is not standardized. Poor inventory management including poor record keeping (observed at all levels), over-ordering,

and poor stock rotation could be the cause of expired stock which was noted at all levels surveyed.

The infrastructure of the storage facilities of HCs and district pharmacies, while adequate in general, lacks maximum protection from extreme heat, e.g., missing ceiling boards and no temperature monitoring. When storing heat sensitive medicine such as PRIMO, this is fundamental.

Providers—Motivation
CHWs say that much of their motivation is spurred by the support and trust they receive from both community leaders and the population in general. They know that the communities are satisfied with their services. Others said that the program has allowed them an opportunity to "give something back" to the community. Helping to care for neighborhood children and watch them get better was another strong motivator. Many CHWs reported being pleased with the way neighbors responded to their efforts to promote community hygiene and other public events. Training was regularly mentioned as a benefit of the program. Several said that the visits by HC staff and their public support for their work were among some of the best kinds of motivation that the program could offer.

CHWs, as well as leaders and caretakers, had an extensive range of suggestions that would be beneficial for motivating the CHWs and enhancing their work. Some suggested providing the CHWs with notebooks, pens, and flashlights or petrol for their lamps so that they can work in the night. Other ideas included providing smocks that could be worn during their work as volunteers. CHW badges, tee shirts, umbrellas, boots and backpacks (to transport books and records) were also suggested. Some CHWs suggested that their work would be easier if required supplies and medicines could be sent to the community since it was sometimes difficult for them to arrange for transportation. Several proposed bicycles since they lived far from the HC. Some CHWs thought that a bonus would be a good way to keep them motivated. In one area, mothers said that they helped the CHWs by, "Keeping an eye out for their children and personal things when they're away from home." Some caretakers recommended that the CHWs be given additional training, as well as thermometers. Most, if not all of these suggestions for motivation, are similar to those made during the 2006 assessment.

Provider—Competencies
Results indicate that the provider competence (knowledge and skills) of the CHWs is good, with most of them performing to standards. There are a few exceptions where more focused attention is needed, such as emphasizing when to bring the child back to the HC or to the CHW, and counseling caretakers on care to be provided to the child at home and awareness of danger signs.

Worker expectations also influence performance. The CHWs see themselves as volunteers who willingly dedicate time to the community. As one CHW put it, "I was chosen by the population for my integrity and so I must do the work and do it well because of the trust (the population) has in me."

Private sector Counter Assistants
Using the same framework, performance of counter assistants in the private sector was assessed. Data were collected on many factors in the framework.

Counter Assistants--Social Factors
Counter staff mentioned that often clients demand specific antimalarials, not necessarily only for children under 5 and often not the first-line antimalarial.

Counter Assistants--System and Organizational Factors
There is no supervisory system in the private sector, and no formal written referral system from the *comptoirs* to the public health system. This could be useful to derive information for the health information system on the types of cases using the private sector, quality of care received, and outcomes.

Visual aids on management of malaria were not widespread inside the *comptoirs pharmaceutiques*. These could be useful to reinforce knowledge of the staff as well as expose the clients to the correct treatment for malaria. On the other hand, both caretakers and CHWs were satisfied with the informational inserts included with the PRIMO packaging.

In general, while inappropriate antimalarial medicines were not found to be available in the *comptoirs pharmaceutiques,* artemether/lumefantrine (only found as PRIMO) was not uniformly available at all outlets and quinine tablets were also only available in less than half of the outlets studied. If the private sector outlets are to be a reliable source of appropriate antimalarial treatment, it is essential that these medicines be available.

In general the price of PRIMO seems standardized throughout the outlets, presumably through the interventions of the ACT subsidy program, although a large variation of price in quinine was noted.

Counter Assistants--Provider Competencies
The counter assistants were knowledgeable on the medicine of choice for mild malaria (PRIMO or Coartem), on its dosing schedule and on essential information on the medicine to communicate to the caregiver. However, this was not mirrored in practice, as noted by the very low rate (23%) at which PRIMO was recommended for the simulated cases of malaria. Some weaknesses were noted in their knowledge of symptoms for severe malaria[15] and in knowledge of how or when to counsel on what to do if the condition gets worse, use of ITNs, and advice on feeding. In general, little information about the dosage of medicines was communicated to the caregivers, additional counseling including prevention of malaria and advice on what to do if the child gets worse, was generally not provided which corroborates the findings that the counter assistants were not very knowledgeable on these issues.

Are caretakers compliant with treatment?
The majority of CHWs stated that they visit the households of the children they prescribe PRIMO to, and one of the main reasons for doing that is to make sure that the caretakers do give the entire course of treatment to the child. Caretaker responses in exit interviews indicate that they are receiving the messages to give the full treatment to their children.

What are the factors that keep the caretakers from seeking prompt treatment for their children?
From the HIS data, 85% of children visiting the CHWs do so within the first 24 hours of fever onset. This would indicate that the HBM strategy is helping to insure every treatment of malaria. Focus group discussions revealed that when children need to be referred, caretakers sometimes have difficulty with lack of transport and money needed to get to the health center.

The CHWs report that when a child was ill in the past, some people would go to the HC for care even though it was a long distance away; although many would also go to traditional healers and pharmacies. There were also some that would, “Stay at home and not do

[15] This could be due to the training activities of PSI and the weaknesses noted could be due to certain outlets not yet covered by the intervention.

anything since they had no money." Since the beginning of the CHW program, many believe that there are fewer delays in getting appropriate treatment for young children.

Many mothers and grandmothers report that they are particularly happy with the CHWs since, "They are people just like us," and easily approachable at any hour of the day. It is interesting to note that, although some districts report difficulties with referrals, in those districts where 1) caretakers have been advised by their local leaders to bring all sick children – not only those with fever -- without delay to the CHW for a referral and 2) where RDTs are being offered, there appeared to be fewer difficulties with getting caretakers to comply with this issue.

Conclusion

The INMCP requested this assessment of the Home-based Management of Malaria program to adjust its strategy and make sure HBM is serving its purposes especially in light of the recent treatment policy change to PRIMO. The results of this assessment indicate that HBM can be a successful strategy to assist the GOR to further control malaria in Rwanda. However, for this strategy to provide sustainable and high quality care, issues of PRIMO availability and supervision need to be tackled and resolved. HBM, as implemented in Rwanda and with the suggested recommendations, can be seen as a potential model for other countries interested in community-based interventions and possibly in using malaria as the driving force for introducing an integrated package at the community level.

RECOMMENDATIONS

While HBM in the malaria program offers a potentially powerful strategy to increase service access to the target population, there are aspects of the program that merit strengthening to increase overall effectiveness and sustainability of results. The 2006 assessment of the program found weaknesses in training, supervision, and logistics. Several recommendations were made to address these. In this assessment, some progress had been made related to in all these areas, but some areas still require strengthening or changes, such as supervision and logistics. New activities were undertaken based on that assessment and other factors -- use of private sector sellers, and use of RDTs. This assessment found both strengths and weaknesses in these new areas. Comparison of recommendations from 2006 and 2008 can be found in Annex 9. Recommendations specifically related to findings in the 2008 assessment include:

1. Renew focus on several tasks of case management
   - All key danger signs need to be checked for (most CHWs did not check for all 5 key danger signs)
   - Key counseling messages (many counseling messages not given)
   - Key counseling techniques (many caretakers left after having received counseling without the knowledge needed)

2. Strengthen the supervisory system so that supervision of CHWs is more consistent and focused on case management:
   - Design and implement a supervision model which incorporates integration
   - For CHWs already trained, ensure that weak technical areas are strengthened (see danger signs and counseling discussion above)
   - Ensure that the CHW supervision checklist is routinely applied; Revise the supervision checklist to include case management. Standardized supervision is essential for ensuring quality of care and appropriate management of medicines.

3. Several issues related to RDTs should be re-examined before scale-up
   - While RDTs are well understood by the CHWs and well accepted by the community, an HRP2 RDT, as suggested in areas where P. Falciparum predominates, should be considered to further facilitate its use by the CHWs[16].
   - Insert RDT performance into supervision checklist of the CHW performing RDTs
   - Develop and implement a RDT stability plan (shelf life, temperature stability and humidity stability)
   - A cost benefit study should be undertaken to understand the benefit of introducing RDT in endemic areas
   - Revise the CCM algorithm to insert the RDT
   - Test the CCM with RDT

[16] Culleton R et al. Failure to detect *Plasmodium vivax* in West and Central Africa by PCR species typing. *Malaria Journal* 7:174 (September 2008).

4. Improve specific elements of the pharmaceutical management of the HBM program:
    - Establish procedures for CHWs and supervisors to clarify the ordering process including quantification of medicines
    - Establish procedures and train staff at health center in good store management and appropriate ordering
    - Reinforce the previous trainings already conducted in most district pharmacies with formative supervision and train only those district pharmacies that are as yet untrained.
    - Reinforce and monitor the reporting system of stock levels and consumption of antimalarials at community and health centre levels and determine a minimum stock level of Coartem to be stocked at the community level.
    - Strengthen and expand the pharmacovigilance of Coartem.

5. Address the key gaps in the quality treatment of malaria in the private sector.
    - Orient the staff of all *comptoirs pharmaceutiques* on the dosing of artemether/lumefantrine even though a prescription is now required, and on other areas for improvement including advising clients on how to administer the medicine, what to do if the child does not get better, prevention of malaria and nutritional advice. The Association of Pharmacists could be a good partner for this type of activity.
    - Develop and disseminate standardized visual aids for the counter staff to reinforce training on dispensing of antimalarials
    - Monitor and follow-up the performance of private sector staff at regular intervals using visits as opportunities for ongoing education.
    - Strengthen linkages between private drug vendors and the public health system (the district health team) to ensure better referral links (for example through the use of standardized referral notes or reports) and quality assessment/supervision
    - Establish a strong national drug regulatory body to regulate importation and registration of medicines, assure the quality of medicines, and regulate the quality of services in the private sector, as well as the public sector.

6. Revisit the recommendation from the 2006 HBM assessment on motivation and the CHWs
        - In the 2006 assessment important attention was given to issues about CHW motivation. While opportunities for education and training, as well as public service and community recognition continue to be motivating elements of the program for volunteers, requests for lamps, bicycles, backpacks, etc. continue, as well as requests for “bonuses”.

        - Some CHWs are concerned about the growing workload and in the absence of a coordinated response by partners on how to provide motivation this could pose a problem.

        - Given that the MOH intends to broaden the mandate of the CHW over the next year, it seems timely to revisit issues about motivation and the associated 2006 recommendations.

All above recommendations will need to be viewed in light of the MoH's goal of integrating HBM for malaria with other community-based interventions which have individually demonstrated their feasibility (ARI, diarrhea, nutrition and other conditions). The MOH is rightly moving towards integration, designing a package of community based activities to be conducted by the CHWs. However, previous experience with each these community based interventions has been limited to a single intervention or small combinations, but not the whole package. The challenge will be to understand the feasibility (proper performance and acceptability) for giving the CHWs a larger number of tasks (including the RDTs in case the MOH decides to incorporate them in the malaria case management). This increases their workload and also requires additional support in terms of training, supervision, reporting systems, as well as community awareness building for the range of new services provided by the CHWs. These challenges are not insurmountable but need concerted planning and implementation accompanied by appropriate human resources and financial support,

ANNEXES

Annex 1: Availability of tracer medicines and supplies at the time of survey, by level

Tracer List	District pharmacy (n=8)	Health center (n=23)	CHW (n=71)
Artemether injection (20 mg/ml)	100%	84%	
Artemether injection (80 mg/ml)	100%	91%	
Coartem 5-14 kg blisters	100%	100%	
Coartem 15-24 kg blisters	88%	100%	
Coartem 25-35 kg blisters	100%	100%	
Coartem 35+ kg blisters	100%	91% N=21	
PRIMO red blisters	75%	87%	83%
PRIMO yellow blisters	88%	87%	94%
Quinine injection (100 mg/ml)	88%	18%	
Quinine injection (300 mg/ml)	100%	78%	
Quinine tablets (300 mg)	100%	96%	
Quinine syrup	50%	47%	
RDTs (limited to 2 districts only Gicumbi and Gakenke)	50%	100%* N=4	96%* n=24
ITNs	12%	83%	25% n=4
Zinc blisters (Kirehe district only)	0%**	100% N=4	57% n=7
Amoxycillin tablets (Kirehe district only)	0%**	100% N=4	50% n=6
ORS (Kirehe district only)	100%**	100% N=4	71% n=7

*sample size is limited to Gicumbi and Gakenke districts (n=2 district pharmacies; n=4 HCs; n=24 CHWs)
**sample size is limited to Kirehe district (n=1 district pharmacy; n=4 HCs; n=8 CHWs)

Annex 2: Average stock available of key antimalarials in terms of months of stock by level

Key Antimalarials	District Pharmacy (n=8)	Health Center (n=27)	CHW (n=71)
PRIMO red blisters / 6-35 months	0.3	3.7	1.2 (n=56)
PRIMO yellow blisters / 3-5 years	0.6	11.1	2.1 (n=55)
Artemether injection (20 mg/ml)	3.4	2.1 (n=24)	
Artemether injection (80 mg/ml)	3.9	1.8 (n=26)	
Coartem 5-14 kg blisters	1.5	1.2	
Coartem 15-24 kg blisters	0.3	0.6	
Coartem 25-35 kg blisters	2.2	1.6	
Coartem 35+ kg blisters	3.6	1.0	

Annex 3: Average percent of time out of stock over a period of six months for tracer medicines and supplies

Tracer List	District pharmacy (n=8)	Health center (n=25)	CHW
Artemether injection (20 mg/ml)	1%	9%	
Artemether injection (80 mg/ml)	6%	4%	
Coartem 5-14 kg blisters	2%	7%	
Coartem 15-24 kg blisters	2%	10%	
Coartem 25-35 kg blisters	2%	17%	
Coartem 35+ kg blisters	0%	6%	
PRIMO red blisters	6%	5%	8% N=61
PRIMO yellow blisters	4%	2%	4% n=46
Quinine injection (100 mg/ml)	6%	0.2%	
Quinine injection (300 mg/ml)	1%	1%	
Quinine tablets (300 mg)	2%	3%	
Quinine syrup	0%	0%	

**sample size is limited to Kirehe district (n=1 district pharmacy; n=3 HCs; n=7CHWs)

Annex 4: Correspondence between actual and recorded stock

Tracer medicines	District pharmacy (n=8)	Health center (n=27)
Artemether injection (20 mg/ml)	83% n=6	87% N=23
Artemether injection (80 mg/ml)	83% n=6	90% N=20
Coartem 5-14kg	83% n=6	84% N=19
Coartem 15-24kg	86% n=7	84% n=19
Coartem 25-35kg	83% n=6	73% n=19
Coartem 35kg+	83% n=6	89% n=19
PRIMO red blisters	83% n=6	75% n=20
PRIMO yellow blisters	83% n=6	79% N=19
Quinine injection (100 mg/ml)	100% n=6	76% n=21
Quinine injection (300 mg/ml)	83% n=6	95% n=19
Quinine tablets (300 mg)	83% n=6	84% n=19
Quinine syrup	100% n=7	85% n=20

*sample size is limited to Gicumbi and Gakenke districts (n=2 district pharmacies; n=4 HCs; n=24 CHWs)
**sample size is limited to Kirehe district (n=1 district pharmacy; n=3 HCs; n=8 CHWs)

Annex 5: Percentage of HC and district stores with expired stock

Tracer medicines	District pharmacy (n=8)	Health center (n=27)
Artemether injection (20 mg/ml)	14% (n=7)	26% (n=23)
Artemether injection (80 mg/ml)	29% (n=7)	28% (n=25)
Coartem 5-14kg	25%	31% (n=26)
Coartem 15-24kg	25%	24% (n=25)
Coartem 25-35kg	25%	36% (n=25)
Coartem 35kg+	25%	23% (n=26)
PRIMO red blisters	29% (n=7)	38% (n=26)
PRIMO yellow blisters	25%	23% (n=26)
Quinine injection (100 mg/ml)	33% (n=6)	23% (n=22)
Quinine injection (300 mg/ml)	25%	36% (n=22)
Quinine tablets (300 mg)	25%	32%
Quinine syrup	20% (n=5)	40% (n=10)
RDTs* pilot health center	0% (n=1)	67% (n=3)
Zinc blisters**	0%	0%
Amoxicillin tablets**	0%	0%
ORS**	0%	0%

*sample size is limited to Gicumbi and Gakenke districts (n=2 district pharmacies; n=4 HCs; n=24 CHWs)
**sample size is limited to Kirehe district (n=1 district pharmacy; n=4 HCs; n=8 CHWs)

Annex 6: Knowledge of labeling and patient information to be given (*comptoir pharmaceutique*)

	Comptoir pharmaceutiques n=33
Labeling should include:	
Patient name	6%
Medicine name	45%
How to take the medicine	91%
Duration	45%
Explanation to the caregiver:	
Medicine name	9%
What it treats	3%
When and how to take it	85%
Side effects	18%

Annex 7: Check-list pour la supervision des activités de santé communautaire dans le village

Check list pour la supervision des activités de santé communautaire dans le village

Date : _____ CS_____

Cellule:_____ Village _____ Lieu d'habitation _____

Nom de l' ASC: _____ Nom du visiteur _____

Activités de l' ASC

	Oui	Non
Activités sont elles communautaires		
Est il allé dans la réunon precedente		

Registre des cas traités

	Oui	Non
registre est là		
Est il correctement completé et lisible		

Traitement	correctement traités	Nombre d'enfants mal traités
Fièvre		
Diarrehée		
Dificulté respiratoire		

Medicaments au moment de la visite

Médicaments et autres outils disponibles	Oui	Non
Amoxycillin		
PRIMO rouge		
PRIMO jaune		
ORS		
Zinc		
Timer		

Visite du menage ayant eu un enfant malade

Signes presentaient par l'enfants au moment de traitement	oui	Non
Fièvre		
Diarrehée		
Difficultté respiratoire		

Age(mois)	

Médicamants recus	Qt totale	par jour	total des jours
Amoxycillin			
PRIMO rouge			
PRIMO jaune			
Zinc			
ORS			

Relation avec autres services de santé	Oui	Non
Referé au CS		
Enfant suivi par l' ASC		

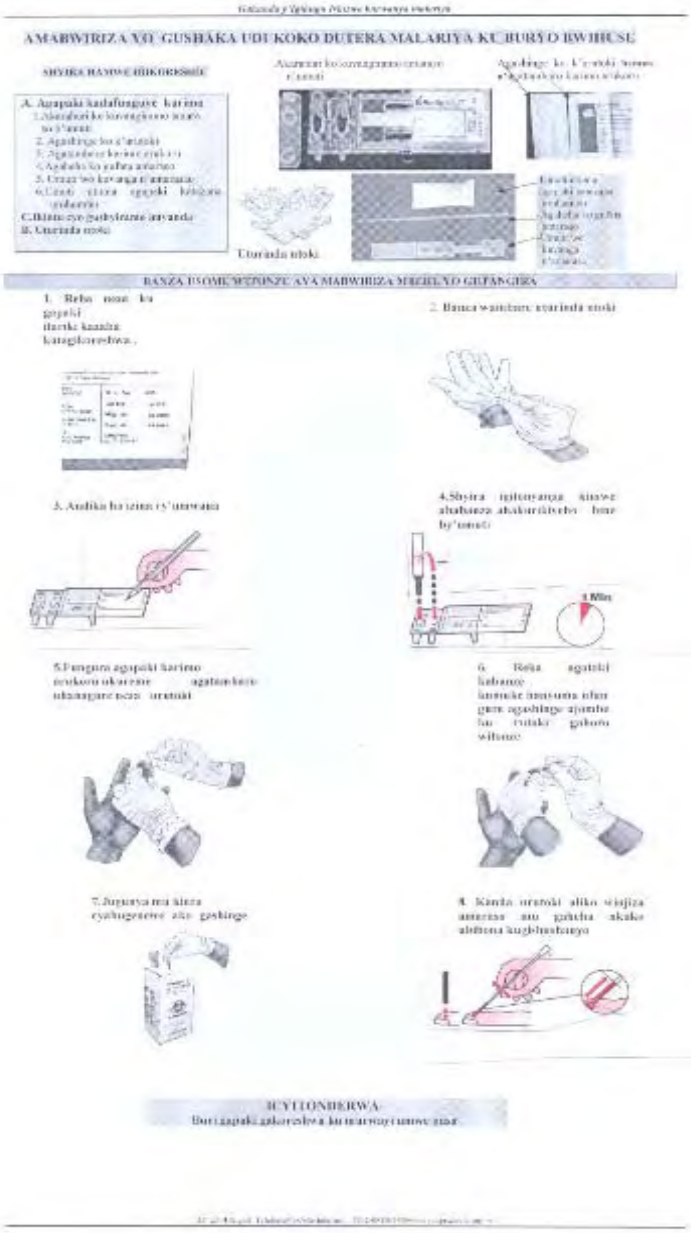
	aggravation de la maladie	Pas amélioré	amelioré	Guérie	Décès
Situation de l'enfant					

Montant payé par le parent à l'ASC	
Montant payé au CS	

	Très safisfaisant	Satisfaisant	Bien	Mediocre
Fonctionnement de l' ASC				
Fonctionnement du CS				

Ibindi bisobanuro:

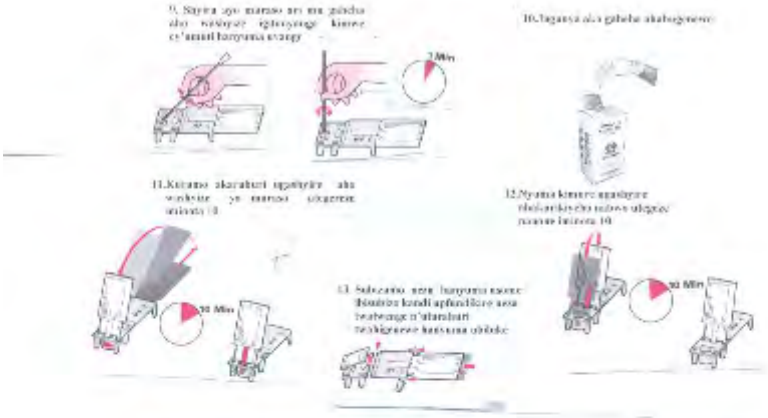
Annex 8: RDT Job Aid for Community Health Workers



AMABWIRIZA YO GUSHAKA UDUKOKO DUTERA MALARIYA KU BURYO BWIHUSE

BANZA USOME NEZWINZE AYA MABWIRIZA MBERE YO GUFATA URA

BYITONDERWA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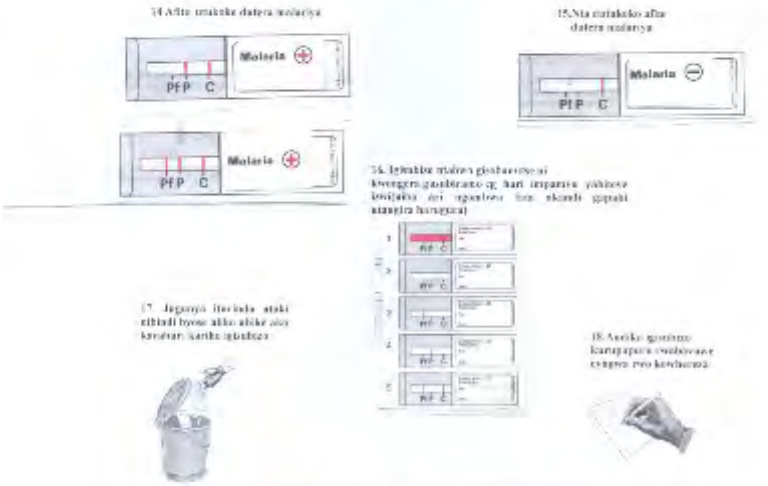
Malaria
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Annex 9: Comparison of recommendations from 2006 and 2008

2006 Recommendations	Relevant findings from 2008	2008 Recommendations
The lack of motivation for Distributeurs must be systematically and comprehensively addressed through a broad discussion with all key stakeholders in the MOH, the districts, and partner agencies so that no single group inadvertently develops an approach for providing motivation that is not sustainable or undermines other approaches.	While opportunities for education and training, as well as public service and community recognition continue to be motivating elements of the program. Distributeurs are still requesting lamps, bicycles, backpacks, etc. to help them with their work. Some are concerned about the growing workload; continue to ask for "bonuses", more visits from supervisors or help with transport for obtaining supplies and turning in reports.	Given that the MOH intends to broaden the mandate of the Distributeurs over the next year so that they are equipped to manage a range of child illnesses, it seems timely to revisit the issue about Distributeur motivation and the 2006 recommendation.
Training and re-training to maintain the skills of volunteers.	While CHWs performed some tasks well, there are specific skill gaps particularly in danger signs and counseling	Renew focus on several tasks of case management – through strengthening focus of training and supervision systems on case management: • All key danger signs need to be checked for (most CHWs did not check for all 5 key danger signs) • Key counseling messages (many counseling messages not given) • Key counseling techniques (many caretakers left after having received counseling without the knowledge needed)

2006 Recommendations	Relevant findings from 2008	2008 Recommendations
Supervision should be standardized for content with standard checklists and focus both on reviewing records/data collection and providing feedback and training to Distributeurs.	Supervision still not adequate in quantity or quality. Checklist being used by supervisor but no focus on case management	• Include specific supervision tasks related to quality of case management into the supervision checklist. • Strengthen the supervisory system so that supervision of CHWs is more consistent and focused on case management: - For CHWs already trained, ensure that weak technical areas are strengthened (see danger signs and counseling discussion above) - Ensure that the CHW supervision checklist is routinely applied. - Standardized supervision is essential for ensuring quality of care and appropriate management of medicines.
Plans to introduce Coartem at the community level should proceed in concert with needed pharmaceutical management system strengthening and monitoring and evaluation,	Training and supervision activities in pharmaceutical management have been ongoing at health center and district levels. New reporting forms have been developed by the MoH/NMCIP for reporting Coartem consumption and for ordering.	Improve specific elements of the pharmaceutical management of the HBM program: • Establish procedures for CHWs and supervisors to clarify the ordering process including quantification of medicines • Establish procedures and train staff at health center in good store management and appropriate ordering • Reinforce the previous trainings already conducted in most district pharmacies with formative supervision and train only those district pharmacies that are as yet untrained.

2006 Recommendations	Relevant findings from 2008	2008 Recommendations
Introduction of treatments for other childhood diseases (e.g., mebendazole for worms, ORT and zinc for diarrhea, and antibiotic treatment for ARI) through Distributeurs warrants further piloting.	Integration has started	Need to reinforce support systems (training, supervision, reporting) if integration is to be successful
Establish and monitor a system of reporting of stock levels and consumption of medicines, especially Coartem and other antimalarials.	A system has been established with new reporting forms developed by the MoH/NMCIP for reporting Coartem consumption and for ordering.	Reinforce the reporting system at CHW and HC levels.
With the expanded distribution of Coartem, developing a pharmacovigilance system to monitor for adverse events is recommended.	Pharmacovigilance system in place for children and pregnant women.	Strengthen and expand the pharmacovigilance of Coartem.
Improve storage conditions at district pharmacies	Improvement of storage conditions of district pharmacies is contained in the district strengthening plans	
Reduce the amount of Coartem stored at peripheral levels	The levels of Coartem stocked are monitored via the monthly reports	Determine the minimum stock of Coartem at peripheral level
Supervision at the district pharmacy level is needed and should be conducted by either the pharmacy task force (PTF) or CAMERWA, in collaboration with the INMCP	Supervisory checklists have been developed for all the MoH	Reinforce the previous trainings already conducted in most district pharmacies with formative supervision
Ensure all storekeepers at district pharmacy level are trained in appropriate store management practices	Most district pharmacy staff have already been trained.	Train only those district pharmacies that are as yet untrained.
Involve a pharmacy body (e.g., CAMERWA or the PTF) in the quantification and monitoring of antimalarial distribution.	CAMERWA is involved in the quantification and procurement process of antimalarials	

2006 Recommendations	Relevant findings from 2008	2008 Recommendations
National guidelines for management of malaria should be distributed and training provided to staff of private sector outlets (comptoirs and dispensaries).	Training in the private sector *comptoirs pharmaceutiques* according to the national treatment protocol is ongoing, implemented by PSI.	Orient the staff of all *comptoirs pharmaceutiques* on the dosing of artemether/lumefantrine even though a prescription is now required, and on aspects of counseling including medicine administration, what to do if the child does not get better, prevention of malaria and nutritional advice.
Develop and distribute appropriate visual aids on the management of malaria and other childhood conditions	The blister inserts are liked by the caregivers and widely understood and also serve to prompt the sales staff in the private sector as needed. Nearly half of the *comptoirs pharmaceutiques* had visual aids on malaria.	Develop and disseminate standardized visual aids for the counter staff to reinforce training on dispensing of antimalarials
Establish a strong national drug regulatory body to regulate importation and registration of medicines, assure the quality of medicines, and regulate the quality of services in the private sector, as well as the public sector.	There was little evidence of inappropriate antimalarials on the market	Establish a strong national drug regulatory body to regulate importation and registration of medicines, assure the quality of medicines, and regulate the quality of services in the private sector, as well as the public sector.
Standardize practices of staff in comptoirs pharmaceutiques and improve the quality of services provided through approaches such as accreditation and/or training and supervision.	The national ACT subsidy program implemented by PSI contains a training element which is ongoing.	• Orient the staff of all comptoirs pharmaceutiques on the dosing of artemether/lumefantrine even though a prescription is now required, and on aspects of counseling including medicine administration, what to do if the child does not get better, prevention of malaria and nutritional advice. The association of pharmacists could be a good partner in this type of activity. • Monitor and follow-up the performance of the staff of the private sector at regular intervals using visits as opportunities of further education.

2006 Recommendations	Relevant findings from 2008	2008 Recommendations
Develop linkages between private drug vendors and the public health system, such as through the use of standardized referral notes.	The district health teams have a mandate to supervise private sector outlets.	Strengthen linkages between private drug vendors and the public health system (the district health team) to ensure better referral links (for example through the use of standardized referral notes or reports) and quality assessment/supervision
Role of RDT	RDTs have been introduced in a number of communities. CHW knowledge and use is quite good and appears well excepted by the community, but quality of some steps problematic.	• An HRP2 RDT, as suggested in areas where P. Falciparum predominates, should be considered to further facilitate its use by the CHWs at the moment in Rwanda it is very important to know the species. • Insert RDT performance into supervision of the CHW performing RDTs Ensure the availability of data on sensitivity and specificity of the RDTs in target population in non-endemic and endemic areas, as sensitivity and specificity will vary with the intensity of transmission[17] and the parasitemia prevalence level.[18] If such analyses have not yet been done, they should be organized. Already done. • RDT stability plan (shelf life, temperature stability and humidity stability) • A cost benefit study should be undertaken to understand the benefit of introducing RDT in endemic areas • Look at the issue of using the RDT in an integrated approach with CCM

[17] Hopkins H, et al Rapid Diagnostic Tests for malaria at sites of varying transmission intensity. J. Infect. Dis 2008, 197:510-518
[18] Rolland E, et al Operational response to malaria epidemics: are rapid diagnostic test cost-effective? Trop Med. Int. Health, 2006, 11:398-408