

REPUBLIC OF BURUNDI



THE MINISTRY OF PUBLIC HEALTH AND THE FIGHT AGAINST AIDS

## Evaluation of community case management of malaria in the pilot health districts of Gahombo, Gashoho, and Mabayi



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The results of this evaluation will guide the Ministry of Public Health and the Fight against AIDS in making decisions related to scaling up the PECADOM strategy.

*The Minister of Public Health and the Fight against AIDS*

*The Honorable Dr Sabine Ntakarutimana*

## ACRONYMS AND ABBREVIATIONS

ACT	artemisinin-based combination therapy
AIM:	CHW Assessment and Improvement Matrix
AS/AQ	artesunate/amodiaquine
BDS	Bureau de district sanitaire (District Health Department)
BPS	Bureau provincial de santé (Provincial Health Department)
CAMEBU:	Centrale d'achat des médicaments essentiels du Burundi (Burundi's essential medicines purchasing agency)
CCM	community case management
CHW	community health worker
COSA	<i>comité de santé</i> (health committee)
DHS	Demographic and Health Survey
DPSHA	Direction de la Promotion de la Santé, de l'Hygiène et de l'Assainissement (Directorate for the Promotion of Health, Hygiene, and Sanitation)
FGD	focus group discussion
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HC	health center
HD	health district
iCCM:	integrated community case management
IMCI:	Integrated Management of Childhood Illnesses
LLITN	long-lasting insecticide-treated net
M&E	monitoring and evaluation
MDG	Millennium Development Goal
MPA	minimum package of activities
MSH:	Management Sciences for Health
MSPLS	Ministère de la Santé publique et de la Lutte contre le SIDA (Ministry of Public Health and the Fight against AIDS)
NGO	nongovernmental organization
NHDP	National Health Development Plan
NHIS	National Health Information System
ORS	oral rehydration salts
PBF	performance-based financing
PECADOM	Prise en charge communautaire à domicile du paludisme (home-based community management of malaria)
PNILP	Programme national intégré de lutte contre le paludisme (Integrated National Malaria Control Program)
RDT	rapid diagnostic test
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
TPS	Technicien de Promotion de la Santé (Health Promotion Technician)
UNICEF	United Nations Children's Fund
USAID	US Agency for International Development
USD	US dollars
WHO	World Health Organization

## EXECUTIVE SUMMARY

In 2009, malaria accounted for 75% of all cases of morbidity seen at the Health Centers (HCs) in Burundi and is still one of the main causes of mortality for children under five. According to the 2012 Malaria Indicator Survey, malaria prevalence among children under five is 17%, with a higher prevalence in the north of the country (24%). Burundi is scaling up effective and timely case management using artemisinin-based combination therapies (ACTs). One strategy is a pilot program for community case management (CCM) at home for malaria—or PECADOM (*prise en charge communautaire à domicile du paludisme*)—to ensure early detection and correct management of malaria in children under five. The pilot took place in three districts in Burundi, and 719 community health workers (CHWs) (one per *sous-colline*) were trained and set up. Before expanding the pilot, the Ministry of Public Health and the Fight against AIDS (Ministère de la Santé publique et de la Lutte contre le SIDA, or MSPLS) wanted to—

- Evaluate the coverage of malaria case management
- Evaluate the quality of care of the CHWs
- Evaluate the capacity of the system to support the PECADOM pilot
- Assess the lessons learned to orient the scaling up of CCM
- Analyze the potential to integrate diarrhea and pneumonia case management (integrated community case management, or iCCM)
- Study the cost of the PECADOM pilot effort and project the cost of iCCM

The evaluation was conducted using a variety of quantitative and qualitative methods in a systems approach.

### Principal Results of the Evaluation

CHWs were chosen according to selection criteria and are well respected by the community. Health authorities, HC staff, and communities are highly satisfied with the CHWs. The attrition rate was 4% over the 11-month study period. However, the only incentives provided to the CHWs were training and equipment, and they consistently said that they did not receive any support from the community.

The PECADOM database indicates that the CHWs saw 62,746 children under five in the three districts over the 11 months of the pilot, of which 59% had a positive rapid diagnostic test (RDT) for malaria, and 82% were seen within 24 hours of the onset of fever. CHWs identified danger signs in about 2.5% of the children who came for consultation and referred 43% of all children consulted to the HC. Any child with a negative RDT result should be referred. More cases are seen by CHWs located farther from the HC than those less than 30 minutes from the HC.

Correct case management includes checking for danger signs, diagnosis using RDTs, treatment, and counseling. Only 15% of CHWs in the pilot could recite all five danger signs, and among those, only 20% actually checked for all signs when managing a child under five with fever. According to the instructional flowchart, CHWs should ask caregivers questions, such as about the presence of fever and other symptoms, age, and consumption of other medicines. The evaluation showed that 60% of CHWs asked all these questions, and 80% physically touched the children to ascertain the presence of fever.

Almost all children (97%) seen by the CHWs were given an RDT, and over half were diagnosed with malaria. Nearly all those diagnosed positive (92%) were given the correct dose of artesunate/amodiaquine (AS/AQ) within 24 hours. Yet most CHWs could not correctly identify the 14 steps necessary to perform the RDT. Of the CHWs who knew all steps for RDTs, 87% practiced them all.

Through analysis of the results of the exit interview, the mothers or the caregivers were observed to have excellent retention of the messages related to administration of medicines that were given during the visit with the CHW. They showed a lower retention of the other general counseling messages; for example, only 37% remembered that they had been told to take the child back to the CHW if the fever persisted.

CHWs were not adequately supervised. Although 85% of the workers received at least one supervisory visit from the HC during the preceding three months, only 45% had received a supervision visit within the last month. The major issue appeared to be the lack of supervisory staff at the HC. However, all the HCs organized monthly meetings with the CHWs, and 94% of CHWs reported having participated in such a meeting in the previous month. However, the meetings had no standardized format and did not include observation of CHWs and so are not fully utilized as a complementary supervisory activity.

On the day of evaluation, 80% of CHWs had all necessary products available, whereas only 54% of the HCs had all products available on the day of the visit. A review of stock-out rates over the six months prior to the evaluation showed that 67% of CHWs experienced a stock-out (defined as one day or more) of AS/AQ for children 2–11 months, 58% of AS/AQ for children 1–5 years, and 61% of RDTs. The majority of CHWs went to the HC to restock when they needed products, rather than complying with the monthly requisition system put in place as part of the pilot phase.

The evaluation team assessed the cost of the current PECADOM pilot and projected the costs for scaling up iCCM. Whereas the recurrent costs of the current PECADOM pilot were calculated to be USD 394 per CHW in 2013, the recurrent cost for iCCM is calculated to be USD 528 per CHW in 2014. The total cost of the program for 2014 is estimated to be USD 1,121,952. The gap in funding of the iCCM package is estimated at 54% of the total cost for 2014 and 78% of the total cost in 2018, based primarily on estimated government subsidization of salary costs relating to supervision and management.

The PECADOM pilot program met its stated objectives—caregivers for children under five are seeking care within 24 hours, and families living in communities with CHWs have better access to care for malaria. However, there are clearly areas for improvement, particularly in the system support of the strategy, including quality of care (primarily knowledge gaps) and supply chain management to support a CCM strategy.

## **Recommendations**

Of the many recommendations generated by the evaluation, these are key:

- Define a clear supervision model focused on improving the quality of care
- Strengthen supply chain management at all levels
- Determine a policy to establish CHWs in villages far from the HCs to ensure sufficient demand for their services and, therefore, to maintain their motivation and skill levels
- Develop a clear plan for scale-up of iCCM under the leadership of a yet-to-be-specified department of the MSPLS and the support of a technical CCM committee (yet to be formed) involving partners and other MSPLS departments and incorporating a clear communication strategy
- Encourage the MSPLS to create a budget line for the community activities and to mobilize resources for the implementation of CCM
- Implement a quality-improvement approach to ensure CHW compliance with standards
- Study and develop a sustainable incentive mechanism for the CHWs, such as the performance-based financing (PBF) system and the formation of CHW associations
- Integrate CCM indicators into the National Health Information System (NHIS) and ensure tracking of logistics data



## I. INTRODUCTION

### 1.1. Context and Rationale

Since the 1990s, significant progress has been made globally in reducing infant and child mortality.

In Burundi, results from the 2010 Demographic and Health Survey (DHS) noted a significant drop in under-five mortality during the 15 years preceding the survey, for the neonatal and postneonatal period as well as the juvenile period, following the prevention and curative measures taken by the government and its partners (table 1). However, this mortality rate is still a concern, requiring greater efforts to significantly reduce it, if not bring it to zero.

**Table 1: Mortality rate for children under five**

	1996–2001 (per 1,000)	2006–2011 (per 1,000)
Neonatal mortality rate	50	31
Postneonatal mortality rate	65	28
Infant mortality rate	115	59
Child mortality rate	101	40
Mortality between birth and fifth birthday	204	96

As in most developing countries of Sub-Saharan Africa, malaria in Burundi continues to be one of the main causes of morbidity and mortality in the general population and among children under five in particular. In 2009, for all diseases, malaria accounted for an estimated 74%<sup>1</sup> of cases of morbidity in the HCs (for all ages) with a steady increase in the number of cases over the last five years. According to the 2012 Malaria Indicator Survey, malaria prevalence among children under five is 17%, with higher prevalence in the north of the country (24%).

### 1.2. The Health System

Burundi provides health services through a pyramidal system structured into three levels—

1. The central level (the Office of the Minister, an Inspector-General of Health, two Directorates-General, para-ministerial institutions, six departments, and nine health programs and related services)
2. The intermediate level (17 Provincial Health Departments or Bureau provincial de santé—BPS)

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<sup>1</sup> NHDP 2011–2015.

3. The peripheral level (45 health districts covering 63 hospitals and 735 HCs spread across the country's 129 communes—one district covers two to three communes comprising 100,000 to 150,000 people)

However, the private sector (despite its provision of services, especially in urban areas), traditional medicine, and community participation are not well integrated into the health system.<sup>2</sup>

The health care network is organized around three levels—<sup>3</sup>

1. The basic level (HCs: A minimum package of activities [MPA] is defined by the central level for each HC, but 45% of HCs provide only a partial MPA because they lack staff, space, equipment, and medicines.)
2. The first referral level (district hospitals that deliver the MPA and the supplemental package, which is often incomplete)
3. The national referral level (specialized hospitals providing care that is unavailable at the other levels)

In terms of access to health services, the MSPLS initiated structural reforms to improve accessibility to care from a geographic perspective by establishing health districts (HDs). Geographic accessibility is satisfactory because the majority of the population (80%) can generally access an HC located less than 5 kilometers away and accessible by road (although sometimes impassable). However, disparities exist between urban and rural settings. Although geographic access is not a major problem, access to care within the required time (particularly in rural settings) remains limited because of other barriers, notably financial constraints, lack of awareness of the seriousness of cases, recourse to traditional healers or to prayer groups and other charlatans, and the like.

Care for children under five and for pregnant women or those who are delivering in public health facilities has been free since May 2006, and first-line antimalarials have been free since 2010. These policies allowed greater access to care for those beneficiaries who are classified as fragile and vulnerable to disease.

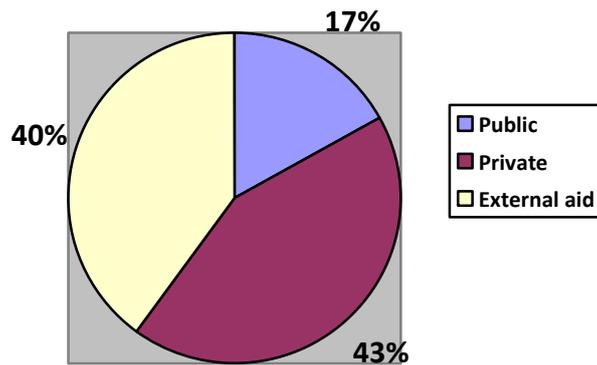
In terms of the availability of human resources, the overall ratio for the entire country is one doctor per 19,231 population (World Health Organization ([WHO] standard: one doctor per 100,000 population). The nurse-to-population ratio is satisfactory, with one nurse per 1,349 population (the WHO standard: one nurse per 3,000 population).

The distribution of funding allocated to health by funding source is presented in figure 1. The largest share is private financing (including 40% for households and 3% for associations, nongovernmental organizations [NGOs], and businesses), and the smallest share is the public portion (including funds from the Heavily Indebted Poor Countries Initiative and public entities).

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<sup>2</sup> NHDP 2011–2015, page 30.

<sup>3</sup> NHDP 2011–2015, page 31.



**Figure 1: Relative share of health financing**

Performance-based financing (PBF) is an innovative approach that helps improve services in HCs for clients and could be an opportunity for iCCM.

### **1.3. Community Participation**

Community participation began in the 2000s with pilot projects for elected health committees (*comités de santé*, or COSAs), which were implemented throughout the country. This approach aims to get people to adopt healthy behaviors and habits and to motivate them to become better self-managers of their health.

This form of community representation quickly revealed limitations related to—

- Resistance among health care staff to collaboration with COSA members
- The limited decision-making power of these COSAs
- The discrepancy between the COSAs' and local communities' expectations, owing to inadequate supervision and capacity building
- Risk of lack of public interest
- The lack of legal status for COSAs and management committees

Given the lack of any strategic direction in community health in Burundi, various approaches to involve the community have been developed under the leadership of several NGOs or other stakeholders (notably with the HIV/AIDS pandemic, the implementation of the “community-directed treatment with ivermectin” approach to control river blindness, etc.). The introduction of PECADOM in 2011 has strengthened community participation through the diagnosis and treatment of malaria, with CHWs providing care at this level. Besides these CHWs, there are also community facilitators, local associations for the fight against HIV/AIDS, and interest groups such as networks of people living with HIV/AIDS, who are particularly active in the prevention of various illnesses and the promotion of health. At the central level, coordination of community-based interventions is provided by the Directorate for the Promotion of Health, Hygiene, and Sanitation (Direction de la Promotion de la Santé, de l'Hygiène et de l'Assainissement, or DPSHA) with active participation from the vertical

programs of the MSPLS. Included among the DPSHA's responsibilities cited in the community health procedure manual are joint annual action plans with partners, advocacy and resource mobilization for community health, monitoring and evaluation (M&E) of partners' activities, coordination of the development and production of communication tools and media for promoting community health, integration of performance indicators related to community health into the PBF Technical Unit's database, and so on. At the health system level, DPSHA partners with vertical programs within the MSPLS or NGOs working at the peripheral level through incentives that vary from one organization to another.

#### **1.4. Strategy for Malaria Control**

Since January 2009, malaria control has been conducted by the Integrated National Malaria Control Program (Programme national intégré de lutte contre le paludisme, or PNILP). The review of this program conducted in October 2011 was an opportunity to conduct an in-depth analysis on the evolution and epidemiological context of malaria and to highlight major findings about its progress and performance.

The fight against malaria continued with the implementation of a new 2013–2017 strategic plan for malaria control based on the following strategic priorities—

- Scale up and maintain the performance of key interventions in malaria case management
- Scale up and maintain the performance of key interventions in prevention<sup>4</sup>
- Intensify community activities to control malaria<sup>5</sup>
- Strengthen preparedness and response to epidemics
- Strengthen the management of the program, partnerships, and resource mobilization
- Strengthen management, partnerships, and resource mobilization
- Improve supply chain management of antimalarial supplies

Gradual scale-up of community-based malaria case management is recommended in the new strategic plan for malaria control.

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<sup>4</sup> Intermittent preventive therapy will be introduced in 2014 according to the 2013–2017 national strategy for malaria control.

<sup>5</sup> The national guidelines for treating malaria (August 2012) recommend injectable artesunate as a first-line treatment for severe malaria, with the second alternative being injectable quinine infusion for both children and adults.

## 1.5. Introduction of PECADOM in Burundi

In Burundi, until 2011 interventions for malaria control at the community level were limited to awareness-raising and mobilization activities by CHWs targeting communities to promote adoption of prevention measures and to seek early care in the event of illness. The CHWs also participated in the distribution of insecticide-treated mosquito nets during mass campaigns. To accelerate achievement of the Millennium Development Goals (MDGs) and universal health coverage, Burundi has implemented other strategies, including community management of health problems. A feasibility study on the PECADOM strategy was conducted in February 2010 in Cibitoke and Kayanza Provinces. Conclusions from this study supported the implementation of this strategy, with the pilot phase launched in three districts—Gahombo, Gashoho and Mabayi—in the Kayanza, Muyinga, and Cibitoke Provinces, respectively. PECADOM, or home-based management, is an intervention through which clinical curative services are provided in the community for children by CHWs trained for this purpose. This strategy was identified to accelerate the achievement of MDG 4 (reduce by two-thirds, between 1990 and 2015, the under-five mortality rate).

PECADOM has been implemented since July 2011 in the districts of Gashoho and Gahombo and since September 2012 in the district of Mabayi. A total of 719 CHWs (including 160 in the Gashoho HD, 242 in the Gahombo HD, and 317 in the Mabayi HD) were trained and began working. In the three districts, each *sous-colline*—the smallest administrative entity—was covered by a trained CHW.

A PECADOM implementation guide was developed that compiled relevant information to inform MSPLS officials about its implementation. The overall goal of PECADOM is to *help reduce mortality caused by malaria*, and its specific objectives are as follows—

- *Reduce geographic inaccessibility by creating the conditions for case management within the local community through its active involvement*
- *Provide early treatment of fever/malaria cases at the community level*
- *Strengthen collaborative relationships between communities and health facilities*

The implementation guidelines were designed and focused on the following strategic priorities, which are specified in the implementation guide—

1. ***Development of documents and tools***: These include an implementation guide, training modules, CHW booklet, data collection forms, referral and counter-referral forms, and supervision checklist.
2. ***Awareness raising for various actors***: Political and administrative officials and community leaders, health care staff (BPS, Bureau de district sanitaire [BDS, or District Health Department], HC), and community were targeted at the start of PECADOM implementation to convince the various partners of the strategy's value and to help them understand that its success depends largely on their collaboration and support.
3. ***Identification of CHWs***: The identification process consists of electing candidates from those who applied for each *sous-colline*. The community itself chooses someone

whom it trusts and who meets the following eligibility criteria: completion of primary education (up to sixth grade), resident in the *sous-colline*, age 20 to 50 years, married, displaying integrity, and agreeing to volunteer. Each *sous-colline* is expected to have one CHW, with no distinction between rural and urban areas.

4. ***Training of trainers and training of CHWs:*** Each training session is three days (with specific content), and the number of participants should not exceed 30 CHWs, with a ratio of one facilitator per 10 people maximum. The chosen training site should be as close as possible to the communities, either at the HC or in a room in the health area.

A single training module is used and covers the following content:

- Background on malaria and presentation of the PECADOM strategy
- Malaria prevention
- What should be done for a fever/malaria case (use of flowchart: Annex 9)
- Diagnosis and treatment of malaria in children under five
- Advice to give to the parents or caregivers of sick children
- Follow-up for children at home
- Product management
- Filling out tools
- Content of the CHW kit (given to each CHW at the end of the training)

The CHWs' responsibilities are also covered in the preservice training. The CHWs' tasks are to raise awareness in the community; to identify, diagnose, treat, and refer febrile children; to partner with the community; and to manage the program at the community level, as shown in Annex 1.

5. ***Procurement system:*** Medicines and other supplies (ACTs, RDTs, and gloves) should follow the usual circuit for obtaining medicines: CAMEBU (Centrale d'achat des médicaments essentiels du Burundi) Burundi's central medicine purchasing agency—HD—HC). An initial donation of products was made by the Pathfinder Maternal and Child Health Project, funded by the US Agency for International Development (USAID), in the districts of Gahombo and Gashoho where PECADOM was first introduced. Later, the MSPLS took over by incorporating products into the usual procurement circuit for districts. The implemented ordering system stipulates that the CHWs complete a monthly order during the coordination meeting at the HC. The Mabayi district also uses this procurement circuit.
6. ***Motivation and encouragement of CHWs:*** The CHWs are volunteers. Implementation considered some motivating factors for CHWs, such as—
  - Providing a suitable CHW kit with personalized articles
  - Involving CHWs when celebrating special events
  - Participating in training and retraining sessions
  - Participating in meetings with covered expenses (snack, transportation, etc.)
  - Providing community support that promotes a climate of social recognition for CHWs as determined by the communities with local government involvement

However, advocacy is under way to ensure that the CHWs are incorporated into the existing PBF system or included in the community PBF program.

7. ***Supervision and evaluation of the strategy:*** The CHWs should be supervised by the HC team, which includes health promotion technicians (Techniciens de Promotion de la Santé, or TPSs)<sup>6</sup> and HC nurses (nurses in charge and their assistants), on a monthly basis during the first three months and then quarterly. Since the TPS is responsible for community-based activities, he or she is best suited to supervise CHWs. Supervision should include the availability and quality of maintenance of tools and products, conditions for their storage, waste management, and observation of the quality of care when the supervision coincides with the presence of a child during a consultation with the CHW. A sheet for interviewing CHWs about their knowledge and general aspects was provided to assess the CHW's mastery of treatment since the likelihood of finding a child in a consultation during the supervision is very low. In addition to supervisions, the HCs should organize monthly meetings for CHWs.

The central level is responsible for conducting one visit per quarter to supervise PECADOM activities in the districts, and in turn, the districts should conduct a monthly supervision visit in the HCs.

This document is an external evaluation report conducted in the three districts of Gashoho, Gahombo, and Mabayi, after 24, 19, and 12 months of implementation, respectively. The following chapters present the objectives and methodology of the evaluation, the key findings, lessons learned, challenges, and conclusions and recommendations.

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<sup>6</sup> A TPS has no clinical training, rather basic training in hygiene and sanitation. The TPS works in three to four HCs.

## II. OBJECTIVES AND METHODOLOGY OF THE EVALUATION

### 2.1. Objectives of the Evaluation

#### 2.1.1. General Objective

The general goal of the evaluation is to “*show the strengths and weaknesses, the opportunities and threats, as well as lessons learned and to make recommendations that will help guide scaling up the strategy for community-based management of malaria.*”

#### 2.1.2. Specific Objectives

- Assess coverage of care related to PECADOM
- Evaluate the quality of care of PECADOM
- Assess the system’s capacity for and support of PECADOM implementation
- Draw lessons from the pilot phase, identify challenges to consider, and make recommendations to guide scale-up of PECADOM
- Analyze the possibility of supplementing the MPA for CHWs by including the management of other childhood illnesses (diarrhea and pneumonia)
- Study the costs related to PECADOM implementation and make forecasts for integrated management at the community level

### 2.2. Methodology and Limitations of the Evaluation

#### 2.2.1. Quantitative and Qualitative Assessment

For this evaluation, the methodology combined a review of documents and secondary data with data collection (quantitative and qualitative methods) at the central, provincial, district, HC, and community levels. The qualitative data collected opinions and perceptions while the quantitative methods were used to collect data on CHW performance, the stock situation, and so on. Annex 3 lists the instruments used.

#### *Review of Documents and Secondary Data*

A review of documents and secondary data was done to analyze how PECADOM coverage, performance, and quality have evolved over time. For the document review, the team of consultants analyzed all available documents, whether related to PECADOM or not. Specifically, these included the 2011–2015 National Health Development Plan (NHDP), the PECADOM guide, the strategy documents and the procedures manual for community health in Burundi, previous evaluations as well as supervision reports and any other document (available from implementing partners) that could provide information on the implementation, and M&E of the PECADOM strategy.

### ***Semi-Structured Interviews***

Semi-structured interviews were conducted by the evaluation team with the following respondents—

- Organizations supporting PECADOM implementation (Pathfinder and Concern) to know the strategy's past, opinions about successes, and issues related to policy, advocacy, ownership, and sustainability as well as costs
- Heads of services of implementation partners: HCs, district pharmacies, district heads, etc., to better understand technical issues specific to training, resources management, supervision, service delivery, the referral system, purchasing, communication, social mobilization, the monitoring and evaluation system, and the health information system
- Community-based CHWs to investigate the CHW selection process, training received, knowledge gained, their motivation, and their suggestions for improving services



### ***Focus Group Discussions***

The investigators organized and facilitated focus group discussions (FGDs) at the HCs (Annex 4) with the following target groups—

- Eight FGDs with beneficiaries, particularly mothers or the caregivers for children (met at the HCs when they came to seek care for their children) on their interest in and opinion of the services provided, the program's contribution to the health of their families, and behaviors among families related to consultations and seeking care
- Eight FGDs with community leaders: COSA members and heads of *collines* who provide the institutional support from the local community for PECADOM, on their opinions about the CHWs, the roles of committee members in supporting PECADOM, the success factors and potential problems, and the current support they provide or plan to provide
- Eight FGDs with CHWs (10 CHWs who were not part of the sample visited at home) on training and supervision, their degree of confidence when performing their work, challenges, their opinions on success factors and possible barriers, suggestions for the future, etc.



### ***Observation and Exit Interview after Consultation***

The evaluation team organized a series of observations of a CHW with a mother or caregiver of a sick child. Because finding patients seeking care at the CHW's home at the time of the visit is rare, this observation was organized in a room at the HC (with at least two observations per CHW). The first observation was not included in the analysis because the CHWs, knowing they were being observed and outside their usual workspace, were likely not at ease while familiarizing themselves with the space; only the second observation was taken into account for the analysis. The CHWs had all their equipment as if they were at home. The investigators observed the interaction and filled out an observation checklist describing how the case management session went.



Exit interviews following consultations were organized with mothers to record the information or advice that the mothers' retained. Similar to the CHW observations, in the analysis of each CHW observed, only the interview with the second mother was taken into account.

### **2.2.2. Cost Assessment**

The analysis and determination of costs for the current PECADOM package and projected costs for scale-up and for an integrated package for treating children at the community level (iCCM) first required the collection and processing of financial, budgetary, and accounting data related to expenses incurred for PECADOM implementation.

Thus, a document review, data collection, and the formulation of assumptions were conducted. The financial, budgetary, and accounting data related to expenses incurred for PECADOM and data on the time spent on related activities were collected from—

- The government (central services: MSPLS, Ministry of Finance, CAMEBU, and PNILP)
- Technical and financial partners (Pathfinder International, Management Sciences for Health [MSH], Concern, etc.)
- Implementation partners (BPS, BDS, and HC)
- CHWs (imputed costs or monetary compensation for volunteering)

Baseline assumptions required for calculations were previously set in partnership with the various stakeholders and the technical evaluation committee.

The following assumptions for costing PECADOM were used—

- Malaria incidence is two episodes per child per year.
- Incidence of fever (and thus the use of RDTs) is four episodes per child per year.

- One CHW serves each *sous-colline*, both for rural and urban settings.
- CHWs receive no wages and have no financial incentives.
- Supervision of CHWs is conducted by two persons from each corresponding HC.<sup>7</sup>
- Coverage of care for the baseline year is 32% of the total population of the three pilot districts for children treated<sup>8</sup> and 19% for RDTs.
- CHWs spend about 15 hours per week (consultations plus meetings) on malaria case management for children.<sup>9</sup>
- The dropout rate for CHWs for various reasons is 4%.<sup>10</sup>
- Antimalarials are provided by USAID and the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund).
- The prices of medicines and equipment used for PECADOM and purchased by the partners (Pathfinder, SIAPS, and Concern) increased by an estimated 15% margin, which is the cost of distribution and delivery to the HC that supplies CHWs.<sup>11</sup>
- Equipment for the CHWs in the two districts of Gahombo and Gashoho, where SIAPS is active, was purchased by USAID, while equipment for CHWs in Mabayi district was purchased by Concern Worldwide.
- Daily doses were recorded based on the national treatment protocol for the management of malaria when determining the proportion of children age 2–11 months and children age 1–5 years.
- The inflation rate is fixed at 8% and the salary increase rate at 7%.

The main components of these costs are salaries, meetings, supervision visits, and related training and are detailed here to help calculate changes in costs if factors in the scenario change.

- Salary calculations for the various managers who oversee PECADOM from the national level of the MSPLS: These are the salaries of some senior ministry staff who assist in the design, implementation, and monitoring of the PECADOM project, including the percentage of time they spend on PECADOM for children under five, based on their statements taken during data collection for this evaluation.
- Salary calculations for the various PECADOM supervisors at the HD and HC levels (using the same calculation as above): The cost of including various supervisors at the district and HC levels is based on their involvement in PECADOM. At this level, the calculation tool automatically calculates these costs in terms of salaries based on the

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<sup>7</sup> Data from the survey conducted in this evaluation.

<sup>8</sup> Calculated using cases seen by CHWs, divided by expected cases based on incidence and population.

<sup>9</sup> Survey conducted in the pilot districts.

<sup>10</sup> Data from the survey conducted in this evaluation.

<sup>11</sup> Estimated lump sum from CAMEBU.

number of HCs where scale-up has been planned for the fiscal year. All of these salary calculations paid by the government include all components of gross salary as well as the employer's share of social security contributions (INSS and MFP).<sup>12</sup>

- The calculations for the salaries of managerial staff and facilitators at all levels of organizations under international partners in the health sector: The managerial staff of these partners are also involved in the implementation of this program, and the cost of this involvement is proportional to their degree of intervention.
- The costs of the program's various monitoring meetings at the HD and HC levels: These costs are related to the length and frequency of the various monitoring meetings. Frequency is four times per year (quarterly) at the HD level with meetings lasting one day, while the frequency for health centers is 12 times per year (monthly), also lasting one day. The per diem rates and transportation costs used for participants in these meetings are those set by the government, or 25,000 Burundi francs (BIF) for per diem and BIF 10,000 for transportation costs. However, for the HCs, only the refreshment rate of BIF 5,000 per participant was used because currently there is no provision at this level.
- The costs of supervision visits at the HC level: These visits occur 72 times per year (6 visits per month per HC) and last one day each. Only fuel costs have been provided for an amount of BIF 10,000 for each of these visits.
- The costs of start-up training and the training of trainers: These trainings of trainers are organized at the HD level and last three days at each start-up time while a one-time preservice training lasting four days for CHWs is also organized. Per diem rates, transportation costs, and refreshment costs have been standardized, as indicated above. It should be noted that the CHWs only receive transportation expenses (BIF 10,000 per day and per participant); the cost of refreshments are also provided, at BIF 5,000 per day and per person participating in this training.
- For the retraining sessions for CHWs, only the cost for refreshments was taken into account, amounting to BIF 5,000 per day and per participant.
- For all training sessions and meetings, other costs related to purchasing office supplies and renting rooms for meetings must be taken into account when costing this project.
- The other costs are expenses that are not included in the range of cost elements mentioned above. These include fuel costs, per diems for staff from partner organizations on monitoring missions, and other expenses not assigned to any of the previously identified cost elements.
- Administrative costs for MSH and Concern in the management of PECADOM have been included because these costs must be covered by either a project or the MSPLS during the scale-up phase.

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<sup>12</sup> INSS = Institut National de Sécurité Sociale (National Social Security Institute) ; MFP = Mutuelle de la Fonction Publique (Civil Service Mutual Scheme).

- Start-up costs of this project: These are the costs of meetings or workshops that were organized to prepare for the actual launch of this project and need not be repeated (for example: meetings and workshops for the development of tools, the implementation guide, etc.).

In addition, the specific assumptions for scaling up PECADOM were established and are as follows—

- The scenario for expansion considered for the cost study is the one proposed in the 2013–2017 strategic plan for the PNILP, shown in table 2.

**Table 2: Progression of PECADOM**

<b>Year</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>
Number of health provinces with PECADOM	3	6	11	15	16	17
Number of HDs with PECADOM	3	6	11	16	21	26
Number of HCs with PECADOM	50	115	211	307	403	499
Number of <i>sous-collines</i> with PECADOM	719	1,313	2,410	3,506	4,602	5,698
Target population covered by PECADOM (all ages)	615,754	1,209,002	2,216,504	3,224,006	4,231,508	5,239,010
Total number of CHWs	719	1,313	2,410	3,506	4,602	5,698
Number of CHW supervisors	100	230	422	614	806	998

- To determine the number of HCs to consider for each year of program scale-up, the average number of HCs per district had to be calculated, amounting to 19 (863 HCs divided by 45 districts), then multiplied by the total number of proposed districts because the districts for scale-up have not been specified.
- The number of CHWs per year was determined as follows: total number of *sous-collines* (9,855) divided by the total number of districts (45) \* number of projected districts for scale-up per year. Similarly, the relevant population for each year was calculated: total population/45 (districts) \* number of districts per year of progression.
- The number of CHW supervisors was obtained by multiplying the number of supervisors—two, which remains constant—by the number of HCs projected per year.
- Coverage of community services through PECADOM would undergo an annual increase of 5% starting at 32% in 2013 and at 19% for RDTs.
- Equipment must be periodically replaced, with an estimated replacement frequency based on a set period for practical use (as shown in Annex 5).

- The number, frequency, and duration of various meetings and training sessions was determined by extrapolating from averages for current meetings.
- In the absence of uniformly applied rates for per diem and transportation and accommodation costs for various partners, the rates set by the government were used.

Costing for introducing the new iCCM project is based on new assumptions because the care package has not been implemented yet. Some assumptions are the same as those for PECADOM.

Assumptions specifically for iCCM are—

- The integrated package of care consists of CCM of malaria, pneumonia, and diarrhea for children under five; the necessary medicines are identified in table 3.

**Table 3: Medicines used in iCCM**

Illness	Medicine	Dose
Malaria	Artesunate/amodiaquine Blister 25/67.5 mg	Children 2–11 months: 1 tablet per day for 3 days
	Blister 50/135 mg	Children 1–5 years: 1 tablet per day for 3 days
Diarrhea	Oral rehydration salts (ORS)	1 packet per day for 3 days
	Zinc tablets 20 mg	Children 2–11 months: 1 half-tablet per day for 10 days Children 1–5 years: 1 tablet per day for 10 days
Pneumonia	Amoxicillin 250 mg	Children 2–11 months: 1 tablet twice daily for 5 days Children 1–5 years: 2 tablets twice daily for 5 days

- The iCCM will be implemented following the same progression that was used for the scale-up of the current PECADOM package, or 6 districts in its start-up phase for the first year, with an annual progression of 5 districts until reaching 26 districts after five years (which is still not the level of complete national coverage), as illustrated in table 4.

**Table 4 Assumptions for the progression of iCCM implementation**

Year	2014	2015	2016	2017	2018
Number of health provinces with iCCM	6	11	15	16	17
Number of HDs with iCCM	6	11	16	21	26
Number of HCs with iCCM	115	211	307	403	499
Number of <i>sous-collines</i> with iCCM	1,313	2,410	3,506	4,602	5,698
Target population covered by iCCM (all ages)	1,209,002	2,216,504	3,224,006	4,231,508	5,239,010
Total number of CHWs	1,313	2,410	3,506	4,602	5,698
Number of CHW supervisors	230	422	614	806	998

For each illness, the estimates for service coverage have been extrapolated because the two other illnesses did not have the baseline data malaria did. Coverage is expressed in terms of expected cases; for pneumonia, the coverage at the community level in 2014 is estimated at 8% of expected cases of pneumonia for the first year. For diarrhea, the coverage in 2014 is estimated at 13% of expected cases for the first year, as shown in table 5.

**Table 5: Changes in community services coverage from 2014 to 2018**

	2014	2015	2016	2017	2018
Treatment of pneumonia	8 %	13%	18%	23%	28%
Treatment of diarrhea	13%	18%	23%	28%	33%
Treatment of confirmed malaria	37%	42%	47%	52%	57%
Rapid diagnostic test for malaria	24%	29%	34%	39%	44%

- The incidence of the three illnesses treated at the community level is—
  - 4 episodes per year for the RDT, including 2 episodes per year for treatment of confirmed malaria
  - 0.46 episodes<sup>13</sup> per year for pneumonia
  - 3.3 episodes<sup>14</sup> per year for diarrhea
- Preservice training is six days for CHWs and five days for trainers. The duration and frequency of monitoring meetings is identical to that used for PECADOM.
- Supervision visits (by the TPS or HC staff) at the HC level lasting one day are organized 6 times per month or 72 times per year.
- For the start-up year, other costs are adjusted by doubling the costs recorded for PECADOM, solely because the number of districts for iCCM start-up is double the number of pilot districts.
- The start-up costs for iCCM (other than training costs), namely meetings or workshops to raise awareness that should be organized before the program’s launch, are identical to the costs incurred during PECADOM start-up.
- Expected funding concerns only the start-up year for program partners whereas the government must continue to run the program at a minimum by covering the salaries of its managerial staff involved in program implementation.

Cost elements are indicated in Annex 5. The costing tool also determined the agreed-upon funding levels by various partners involved in PECADOM and iCCM implementation by clearing out the surplus or deficit. The results are analyzed and highlighted in section 3.5 of this report.

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<sup>13</sup> Rudan I., et al. Epidemiology and etiology of childhood pneumonia in 2010. *Journal of Global Health* 2013;3(1).

<sup>14</sup> Fischer-Walker et al. Incidence in low- and middle-income countries in 1990 and 2010: a systematic review. *BMC Public Health* 2012;12:220.

### **2.2.3. Sampling<sup>15</sup>**

Two degrees were implemented for sampling—

For the first degree, a sample of 24 of a total 50 HCs was used, or close to half (48%). The 24 HCs were randomly selected from the three pilot districts, comprising a sample providing reliable estimates (sample minimum of 20<sup>16</sup>). Distribution was as follows: 12 HCs of a total 25 in Mabayi, 6 HCs of a total 13 in Gahombo, and 6 HCs of a total 12 in Gashoho.

For the second degree, a sample of CHWs (either 6, 7, or 8<sup>17</sup> CHWs per sample HC) with an overall sample size of 156 CHWs, producing a confidence interval of 95% ( $\pm 7\%$ ) (list of HCs in Annex 4).

From sample size calculations, a sample of 156 CHWs allows for precise estimates  $\pm 10\%$  (with more than 90% confidence).

In each of the 24 HCs, 4 CHWs<sup>18</sup> were selected at random to participate in observations, producing a sample of 96 CHWs who were observed and 96 exit interviews following consultations with the same mothers or caregivers of the children treated.

FGDs with 10 people per group were organized: eight with CHWs, eight with community leaders, and eight with mothers. The mothers and caregivers were chosen from those who came for a consultation for a child. The FGDs took place in the morning when many of the children's mothers and caregivers were still standing in line. The CHWs selected to participate in these discussions should be different from those who were interviewed at home to avoid duplicate responses to questions asked during the group discussion and those during the individual questionnaire. Given that some HCs in the sample have a limited number of CHWs, especially in Gashoho, two FGDs with CHWs were organized in HCs outside the initial sample (Annex 4). Among the Gashoho HCs that were in the sample, one had 17 CHWs whereas the others had between 6 and 13. Table 6 summarizes the samples covered during the evaluation.

A randomized process was used for drawing samples.

- The three pilot districts (Mabayi, Gahombo, and Gashoho) were all considered for the evaluation.
- The 24 HCs were selected by using a numbered list of the HCs, knowing that half of these HCs would be included in the sample. Then, a coin toss was used to determine whether to select the odd or even numbers. The coin toss fell on the odd numbers in all three districts (sample presented below).

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<sup>15</sup> The protocol provided for conducting an analysis of NHIS data on malaria in the pilot and control districts, but the evaluation encountered limitations because of the availability and reliability of existing data.

<sup>16</sup> *Investigating drug use in health facilities, WHO 1993.*

<sup>17</sup> To compensate for the HC samples where it was not possible to have a sample of six CHWs.

<sup>18</sup> The random sample (at  $\pm 7\%$ ) is about 100, which, based on 24 HCs, is equal to 4.2, which has been rounded to 4 CHWs per HC.

- For the CHWs, the list of CHWs by sample HC was used to draw six, seven, or eight CHWs per HC. The new list of HCs was renumbered for each sample, and six CHWs were drawn from the even-numbered HCs, and seven CHWs were drawn from the odd-numbered ones. There was no drawing for HCs whose total number of CHWs was equal to or less than six. However, to compensate for the insufficient number of CHWs in those HCs with low numbers of staff, eight CHWs were drawn from the HCs with the largest pools of CHWs. Then a random drawing was done using numbered pieces of paper placed in a box to pick the total number of CHWs needed for the sample. Only those workers selected in this random drawing were included in the sample.
- The CHWs who were directly observed were chosen from the list of CHWs who participated in an individual interview in their homes so that their theoretical knowledge could be compared to how they put it into practice.
- Two mothers or caregivers for children were interviewed upon leaving a consultation with the CHW (the same mothers who were observed during the consultation).

**Table 6: Expected and actual samples**

	Expected sample	Actual sample
Interviews with CHWs (including questions about costs)	156	156
Interviews with HC managers	24	24
Interviews with district pharmacy managers	3	3
Interviews with district heads	3	3
Interviews with BPS managers	3	3
FGDs with CHWs	8	8
FGDs with mothers	8	8
FGDs with community leaders	8	8
Observations and interactions between CHW and mother	96	87
Exit interviews with mothers after the consultation	96	87

The expected sample for the observation of the CHW-mother interaction and the exit interviews with the mothers could not be met, following a logistical problem causing the teams to arrive late to the HCs on the final day of data collection and leaving them unable to find any more children waiting for a consultation.

#### **2.2.4. Training and Recruitment of Investigators and Data Entry Clerks**

From September 9 to 13, 2013, 48 candidates for investigators, 8 team leaders, and 12 candidates for data entry clerks were trained, among whom 40 investigators, 8 team leaders, and 8 data entry clerks were recruited on September 14–15, 2013. During the training period, September 12, 2013, was devoted to the pretest of the CHW questionnaire in the districts of Gahombo and Mabayi, but in sites not selected for the survey. Final selection of the investigators and clerks was based on the questionnaires filled out during the pretest. The evaluation team is listed in Annex 7.

### **2.2.5. Data Collection**

Data collection was conducted by eight teams of five investigators and one team leader each. The chosen CHWs received advance notice of either the date of the visit to their homes or the date they should go to the HC. Collection required seven full workdays in the field, from September 17 to 23, 2013.

Quality control was done through supervision and monitoring of the teams during collection and double-entry in the field. Two consultants supported by a SIAPS staff member and two technical committee members performed this work.

### **2.2.6. Data Entry, Processing, and Analysis**

Data entry was conducted using the Access database designed for this purpose. Double-entry was performed to maintain quality control. Data analysis and tabulation were done using Access and Excel.

Data triangulation between the different data collection techniques was performed to show the relationship between knowledge, practice, and the messages retained by mothers.

Indicators on frequencies and cross-analysis of variables using tables and figures were defined and used for writing this report.

### **2.2.7. Limitations of the Evaluation**

This evaluation was designed to provide an overview of the PECADOM experience across three pilot districts. The methodology includes a literature review, semi-structured interviews, FGDs, and direct observation. However, the last methodology of direct observation has limitations. The observed CHWs were not in their usual work setting (at home), which could make them nervous because they know they are being observed by third parties and lead to bias in performing the various treatment steps (omissions, changes in the order described in the protocol). The opposite is also possible; a CHW could carry out a task correctly because he or she is being observed. As explained previously, to minimize errors and reduce bias, CHWs were interviewed during two consultations, and only the second one was taken into account in the analysis. In addition, to ensure the CHWs were at home for the interview, they had to be warned before the day of the visit, which could also cause some bias in the responses given.

Other problems encountered by the evaluation concerned the following—

- The availability and reliability of data from the NHIS for deaths, cases of uncomplicated malaria, and cases of severe malaria, making it impossible to effectively analyze this data.
- The short duration of the PECADOM implementation period, particularly in terms of analyzing the strategy's impact on mortality for children under five and reducing malaria cases. In addition, data collection on mortality requires specialized methods on a very large sample, which could not be set up in this evaluation.
- The selection of mothers and caregivers who participated in the FGDs held at the HCs did not take into account where they were from, which could introduce bias in the

event of the possible presence of participants (albeit marginal) from *sous-collines* outside the PECADOM district.

### **2.2.8. Evaluation Team and Time Period**

Under the coordination of the technical committee, the PECADOM evaluation was conducted by a team<sup>19</sup> composed of three national consultants, eight data collection team leaders, 40 investigators, and eight data entry clerks. The mission also received help from the MSH team, both on site and remotely, from the August to October 2013.

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<sup>19</sup> See list in Annex 7.

### III. KEY FINDINGS OF THE EVALUATION

Analysis of the results is based on key indicators (Annex 2) and follows the objectives sought in the PECADOM evaluation.

#### 3.1. Description of the CHW Sample

During collection of evaluation data, particular attention was paid to how CHWs were recruited and some of their sociodemographic and economic characteristics, such as age, education level, marital status, and primary occupation. Overall, the CHWs were selected and also underwent screening tests according to the procedures described in the implementation guide. The results were formally announced during meetings led by government officials. This was confirmed by community leaders and mothers during the FGD sessions: *“They were selected and introduced to the community by the local government”*; *“He was selected by the community during a meeting because he submitted his candidacy.”* In an evaluation sample of 156 CHWs (including 53% women), 97% live off agriculture. Overall, the age requirement for CHWs (20–50 years) was met in 94% of cases, with the exceptions being one person in Gashoho who was 19 and eight others who were over 50. Among these, four were between the ages of 51 and 52 (all in Mabayi), which is normal given the time lapse for implementation. For the education level, the evaluation results show that some did not meet the requirement of having completed primary school (5 of 156, or 3%).

Although the eligibility criteria indicate that preference should be given to married individuals, in the sample of CHWs selected for the survey, there were people in common-law unions or who have never been married (18 of 156, or 12%). All CHWs work on a volunteer basis. In terms of their access to their assigned HCs, of 156 respondents, 26% had less than a 30-minute walk, 26% had more than an hour to get to the HCs, and the rest (48%) had a trip between 30 and 60 minutes by foot.

The overall conclusion is that the CHW selection met the predefined criteria.

#### 3.2. Care Coverage Related to PECADOM

The evaluation of the coverage of care in the context of PECADOM was done through statistical analysis of information that the CHWs regularly report on treated and referred cases of malaria. These data are incorporated into the database designed for this purpose. Based on the data in these databases and reported during the last 11 months, several key indicators stand out that are discussed in the following paragraphs.

**Table 7: Distribution of children who had a consultation with CHWs during the last 11 months (September 2012–July 2013)**

	Gahombo	Gashoho	Mabayi	Overall
Number of children seen by CHWs	13,864	22,336	26,546	62,746
Average number per month	1,260	2,031	2,413	5,704
Number of CHWs	242	160	317	719
Monthly average/CHW	5.2	12.7	7.6	7.9
% of children with danger signs	1.7	0.8	4.5	2.5
% of children seen within 24 hours of onset of fever	86.3	82.8	77.9	81.5
% of children who had an RDT	98.8	99.3	95.0	97.4
% of children with positive RDT	52.3	78.0	46.1	58.8
% of children with negative RDT	46.5	21.4	49.0	38.6
% of all children with positive RDT treated	98.0	98.8	99.3	98.8
% of children referred	53.3	23.9	53.3	42.9
% of children with positive RDT seen within 24 hours of onset of fever and treated correctly <sup>20</sup> among all children with fever	49.6	66.0	45.8	53.8
% of children with positive RDT seen within 24 hours of onset of fever and treated correctly among cases of positive RDTs	94.9	84.6	99.3	91.5

Source: PECADOM database.

The number of children who had a consultation during the last 11 months is 62,746; 81.5% had a consultation within 24 hours of onset of fever for children presenting fever. This indicator was never measured before because it is not included in the NHIS, thus it cannot be compared to the period before the PECADOM intervention. However, the percentage is notably high. For children who had a consultation, 97.4% received an RDT, among these 58.8% had malaria, and 98.8% of the children had a positive test and received the correct antimalarial treatment. Among the children who had a positive RDT, 91.5% received the correct treatment within 24 hours of onset of fever, as shown in table 7. This proportion is much higher than the 2013 target of 82% set by the 2013–2017 national strategic plan for malaria control.

Nearly half (42.9%) of children were referred by CHWs to the HCs. Among them were children who had negative RDTs (38.6%), children presenting danger signs (2.5%), and children referred after treatment presenting signs for illnesses other than malaria, but the database does not indicate the proportion.

Plans were made to conduct an analysis of severe and uncomplicated cases seen at the HC, but the many discrepancies in the NHIS data did not permit this analysis.

<sup>20</sup> Correct treatment means treatment with the adequate dose corresponding to the child's age.

As mentioned previously, each *sous-colline* in the pilot districts should have one CHW for PECADOM. In the three HDs of Gahombo, Gashoho, and Mabayi, the CHWs were not working in 14 (of 359) *sous-collines*, or a dropout rate of 4% (table 8). Reasons for dropping out were not explained except for those who dropped out following a move, according to HC managers. New elections of CHWs were held in both districts of Gahombo and Gashoho, and 130 CHWs (45 in Gahombo and 85 in Gashoho) who work with PECADOM were not reelected. In fact, well before PECADOM, two CHWs per *colline* were working in community health activities, independent of the number of *sous-collines*. With PECADOM, one CHW per *sous-colline* was elected to work exclusively for PECADOM. A reform<sup>21</sup> has been introduced to have only one CHW responsible for all community health activities (including PECADOM) per *sous-colline*. The CHWs were selected from among all the existing CHWs. Wherever there was more than one CHW per *sous-colline*, one had to be chosen, leading to a massive departure of CHWs responsible for PECADOM in the two districts. It is intended that that new CHWs be trained in PECADOM so that all *sous-collines* can be covered.

**Table 8: Proportion of served *sous-collines* with a working CHW**

	<b><i>Sous-collines</i> with working CHWs</b>	<b>Dropouts</b>	<b>Total</b>	<b>% dropout</b>
Gahombo	155	6	161	3.7
Gashoho	68	3	71	4.2
Mabayi	122	5	127	3.9
Total	345	14	359	3.9

Compared with the PECADOM CHWs, most participants in the FGDs said that they know about them, and among the participants, some had already been to the CHW for a child's care. They received a treatment: "*The CHW gave the first dose and gave instructions on how to give the other doses at home.*" In addition to care, some participants in Mabayi said that the CHWs raise awareness among caregivers during the consultations about vaccinating their children. This is a crucial role though not specific to PECADOM. However, some FGD participants said that they do not know about the PECADOM CHWs, which could be a risk for the strategy. However, this situation should be qualified, because the selection of mothers for participation in the FGDs did not take into account which *colline* they came from beforehand; therefore some of them could have come from *collines* not served by the pilot districts with a PECADOM CHW.

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<sup>21</sup> Manuel des procédures en santé communautaire, January 2012, page 21, section III.5.3.

**Table 9: Percentage of children seen by CHWs compared to those expected, based on their distance from the HC**

HD	Number of children seen by CHWs who live less than 30 minutes from the HC	Number of children served by CHWs who live less than 30 minutes from the HC	%	Number of children seen by CHWs who live 30 minutes–1 hour from the HC	Number of children served by CHWs who live 30 minutes–1 hour from the HC	%	Number of children seen by CHWs who live more than 1 hour from the HC	Number of children served by CHWs who live more than 1 hour from the HC	%
Total	635	7,894	8.0	1,660	11,507	14.4	755	4,813	15.7

The analysis presented in table 9 was done for the 134 CHWs who know the data for the population they serve. The total population served by these CHWs was 24,215 children under five. The same CHWs saw 3,050 children during the three-month period preceding the evaluation.

The proportion of children who are treated by a CHW is greater among children who live farther from the HC, compared with children who live close to the HC. In other words, for children living less than a 30-minute walk to the HC, the families prefer to seek care at the HC rather than go to the CHW (table 9).

As shown in table 10, the 3,050 children seen by the 134 CHWs during the three months preceding the evaluation is a low proportion: 12% of all expected cases during three months, given the assumption of four episodes of fever per year and per child under five, based on the estimated population of 24,215 children under five covered by 134 CHWs for whom data were sent.

**Table 10: Percentage of children seen by CHWs versus expected**

Population of children under 5 years	Expected number of fever cases in 1 year	Expected number of fever cases in 3 months	Number of children seen in 3 months	Percentage
24,215	96,860	24,215	3,050	0.12

## Assessment of PECADOM

### *HCs, BDSs, and BPSs Assessment*

Interviewees from the HCs, BDSs, and BPSs expressed great satisfaction with the PECADOM strategy; for example, they said, “*The CHWs provide services that people badly need.*” In fact, close to 63% of HC managers stated during interviews that PECADOM reduces the number of severe malaria cases because of their rapid treatment by CHWs; others (25%) think that the mortality rate has dropped following the implementation of PECADOM. PECADOM helps lessen HCs’ workload by decreasing the number of consultations at the HC level. Officials from the BPSs and BDSs also believe that PECADOM reduces mortality and

the number of severe cases and improves the community's knowledge about malaria prevention.

When asked whether PECADOM decreases HC revenues in the context of PBF, up to 92% of the HCs responded no. According to some HC managers, the drop in the number of children who seek care in the HC (since malaria is treated at the community level) is compensated by other care, given that demand for services is still greater than supply. Health care providers have cleared enough time to provide services for which indicators report more revenue goes to the HCs than for the treatment of children under five. The evaluation did not calculate and compare the amount of subsidies that HCs received before and during PECADOM to confirm these statements.

### ***Community Assessment***

Community leaders confirm that the CHWs are always available to and close by the beneficiaries. Some of them or their family members have already sought services from the CHWs. They praise the actions of CHWs who stop their own activities to focus on the community's children voluntarily, and they think that people are going to see charlatans less and less and that the number of child deaths in the community has declined.

Regarding factors that motivate parents to seek care early for their children, community leaders state—

- *“Children under five are fragile; if parents delay seeking care, uncomplicated malaria can become severe malaria.”*
- *“Care for children under five is free.”*
- *“Because the CHWs are nearby, the parents can consult them even at night.”*
- *“Sensitization by the CHWs prompts parents to get children treated quickly.”*

By contrast, factors that can cause delays in seeking care for a child include misconceptions and recourse to traditional healers and sorcerers.

During the FGDs, the mothers identified changes in treatment for childhood illnesses: *“In the past, some parents would head to traditional healers, but today sensitization of leaders means that parents take their children to CHWs or the HC.”*

Although the interview is not the best method for assessing satisfaction, mothers interviewed when leaving the CHW consultation expressed their level of satisfaction about it. They are all very satisfied or satisfied (100%) (table 11). This is corroborated by comments during the FGDs with mothers. They also indicated that they know about the CHWs and that they consult them when their children are sick.

**Table 11: Proportion (%) of mothers or caregivers of children by their level of satisfaction after the consultation**

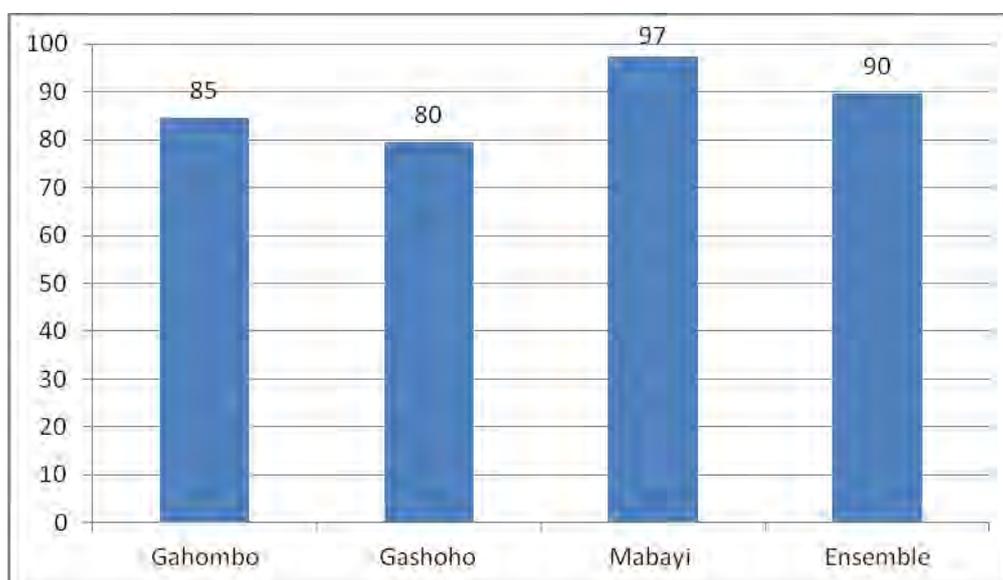
	Very satisfied	Satisfied	Dissatisfied	Very dissatisfied	No response
CHW's tone	57.8	42.2	0	0	0
Examination process	61.3	38.7	0	0	0
Advice received	60.5	39.5	0	0	0
Treatment received	52.9	47.1	0	0	0

### *CHW Assessment*

During the FGDs, the CHWs say that there is a high level of satisfaction about the services they provide to the community. In addition, among those who were interviewed, the majority (145 of 156, or 93%) believe that their services meet the expectations of community members while the remaining 7% believe that they partially meet the community's expectations.

### *Sensitization Visits*

As mentioned in the previous section, plans were made for CHWs to make sensitization visits in their communities to inform people about malaria and its treatment and prevention. As shown in the figure 2, 2.90% of CHWs surveyed made at least one sensitization visit in the intervention areas during the last three months.



**Figure 2: Proportion (%) of CHWs who made at least one sensitization visit in the intervention area during the last three months**

### **3.3. Quality of PECADOM Care**

The quality-of-care assessment was conducted using indicators for CHWs' knowledge and practices for the tasks they must perform.

The CHWs identified the services that they have been requested to provide to the community: 99% of CHWs interviewed say they treat only malaria, diagnose malaria using RDTs, and treat malaria with AS/AQ (two CHWs from Mabayi mentioned river blindness). In addition, 97% know the blister pack for AS/AQ 2–11 months is pink and purple for AS/AQ 1–5 years.

The tasks that they have been asked to carry out, based on statements from the CHWs, can be summarized in six points—

- Sensitizing the community about health problems (76%)
- Identifying children who have malaria (70%)
- Treating malaria (96%)
- Giving advice on taking medicines (74%)
- Referring and providing follow-up for children (74%)
- Providing follow-up for children (60%)

It is important to note that few CHWs mentioned follow-up of children compared with those who mentioned treatment.

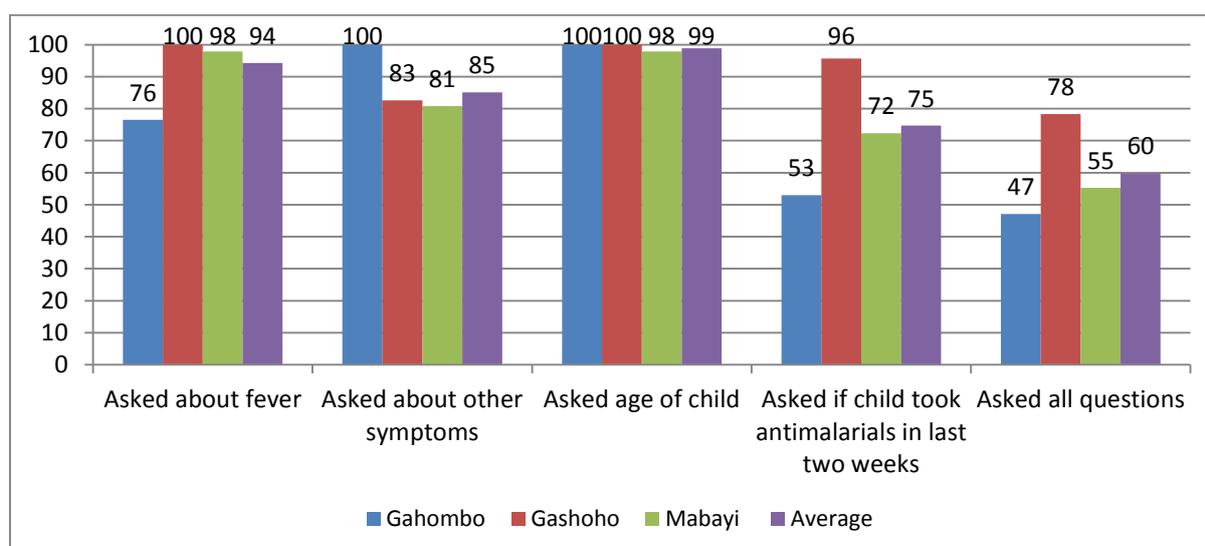
## Treatment

This section describes efforts to compare the level of knowledge and the practice of the various steps of malaria case management by CHWs and the information that mothers retain after the consultation. The aspects analyzed are (1) assessing the child’s condition, (2) checking for danger signs, (3) diagnosis, (4) treatment, (5) advice, and (6) referral.

### 3.3.1. Assessing the Child’s Condition

Assessing the child’s condition should be done by checking for fever and danger signs in the child’s history of illness and through a basic physical exam.

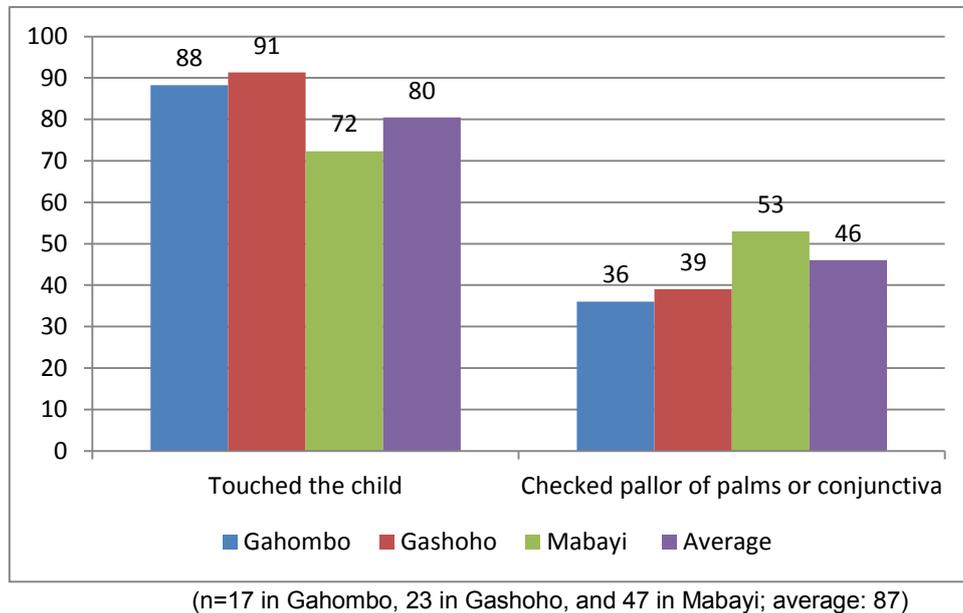
Figure 3 shows the observation results on the interaction between CHWs and mothers. Only 60% of CHWs routinely ask all the questions to assess the child’s condition.



(n = 17 in Gahombo, 23 in Gashoho, and 47 in Mabayi; average: 87)

**Figure 3: Proportion (%) of CHWs who ask all questions about the child’s history**

In addition to the questions that CHWs ask caregivers, they must conduct a basic physical exam to assess the child’s condition: for example, physically touch the child to check for fever, check the pallor of the palms and the conjunctiva (a sign of anemia).

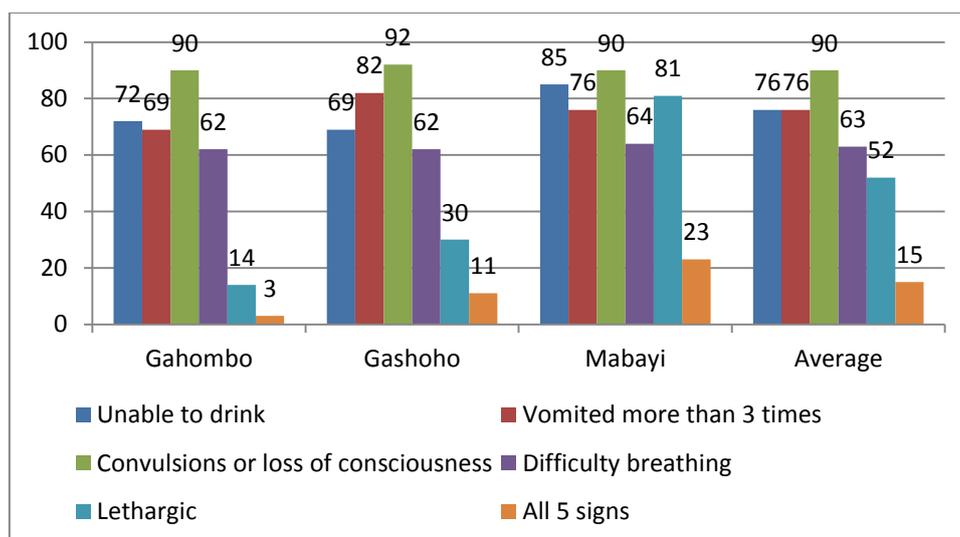


**Figure 4: Proportion (%) of CHWs who conduct a physical exam**

During the observed consultation, 8 of 10 CHWs touched the child, as shown in figure 4, while less than 5 of 10 check the pallor of the palms or the conjunctiva.

### 3.3.2 Checking for Danger Signs

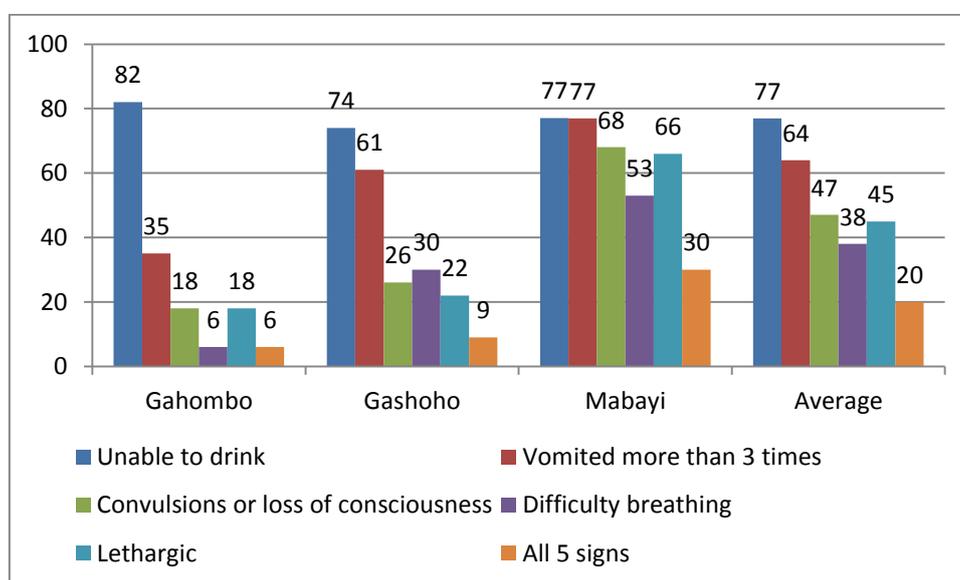
Knowledge about danger signs, or the CHWs’ ability to screen for danger signs so that the child can be referred immediately during the consultation, varies from one sign to another and from one district to another even though the signs are included in the CHW flowchart. As shown in figure 5, only 15% of interviewed CHWs mentioned all the danger signs.



Knowledge = Interview: n = 39 in Gahombo, 39 in Gashoho, 78 in Mabayi, and n = 156 overall

**Figure 5: Proportion (%) of CHWs who know the danger signs (source: interview)**

For the 87 CHWs who were observed during a consultation, only 20% checked for all the danger signs, as shown in figure 6; the inability to drink is the most frequently detected danger sign. These results show a correlation between practice and knowledge because, overall, the percentage of those who mentioned the danger signs (15%) is close to the percentage of those who put them into practice (20%).



Practice = Observation: n = 17 in Gahombo, 23 in Gashoho, and 47 in Mabayi, n = 87 overall

**Figure 6: Proportion (%) of CHWs who check for danger signs (source: observation)**

Next, the study team analyzed the triangulation between knowledge and practice to show which of the CHWs could identify the signs and how many checked for the same signs.

Figure 7 compares the results for knowledge and practice. Among the 87 CHWs observed, only 18% identified all the danger signs, and among these, only 56% correctly checked for all five signs. This reveals that practice is not related solely to knowledge, because all the CHWs who cited the different danger signs did not check for them in practice.

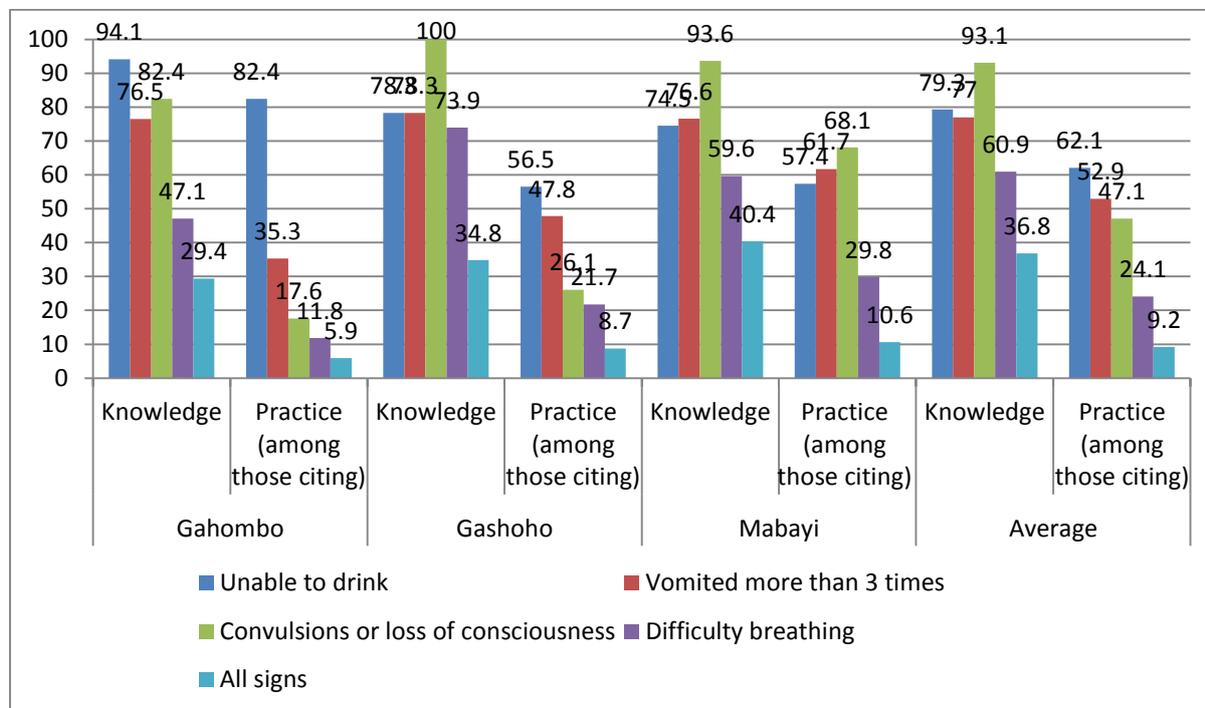


Figure 7: Proportion (%) of CHWs who check for danger signs among those who identified them during the interview (source: observation)

### 3.3.3 Diagnosis Using RDTs

During the survey, the CHWs were asked a question to determine if they know the steps for the administering the RDT. This was also directly observed during the CHW interaction with mothers. The results are presented in table 12.

When analyzing just the practice in the group of those who have the theoretical knowledge (table 13), of the 36.8% observed who cited all the RDT steps, 87.5% actually carried them out during the test conducted in the consultation. This shows that when performing the RDT steps, knowledge is strongly correlated with practice: The more one knows, the more one performs correctly. There are weaknesses in knowledge, but practice is good for those who have the knowledge.

**Table 12: Proportion (%) of CHWs who know and correctly practice the steps for an RDT**

Steps	Gahombo		Gashoho		Mabayi		Overall	
	Knowledge n=39	Practice n=17	Knowledge n=39	Practice n=23	Knowledge n=78	Practice n=47	Knowledge n=156	Practice n=87
Check the RDT expiration date	71.8	35.3	66.7	82.6	85.9	68.1	77.6	65.5
Begin by putting on gloves	97.4	64.7	94.9	91.3	96.2	78.7	96.2	79.3
Hold RDT horizontally	69.2	64.7	51.3	82.6	79.5	80.9	69.9	78.2
Seat the mother comfortably	69.2	64.7	48.7	95.7	82.1	78.7	70.5	80.5
Clean the finger with disinfectant	92.3	64.7	97.4	95.7	91.0	80.9	92.9	81.6
Discard lancet in security box	74.4	64.7	71.8	95.7	80.8	80.9	76.9	81.6
Use capillary tube correctly	71.8	64.7	79.5	95.7	79.5	80.9	77.6	81.6
Place blood in the first hole	94.9	52.9	84.6	91.3	42.3	80.9	66.0	78.2
Discard capillary tube in the security box	94.9	52.9	84.6	65.2	89.7	80.9	89.7	71.3
Add two drops	84.6	64.7	56.4	87.0	83.3	80.9	76.9	79.3
Discard gloves in security box	71.8	52.9	69.2	65.2	69.2	80.9	69.9	71.3
Let test sit for 15 minutes	76.9	64.7	59.0	69.6	85.9	78.7	76.9	73.6
Interpret correctly	94.9	58.8	92.3	95.7	89.7	80.9	91.7	80.5
Discard test in security box	66.7	58.8	48.7	47.8	69.2	76.6	63.5	65.5
CHWs who correctly followed all steps	28.2	28.7	13.4	22.4	41.2	62.3	30.5	44.7

Knowledge determined from interview.

Practice determined from observation.

**Table 13: Proportion (%) of CHWs who perform the RDT steps among those who know them**

Steps	Gahombo		Gashoho		Mabayi		Average	
	Knowledge <sup>22</sup>	Knowledge and Practice <sup>23</sup>	Knowledge	Knowledge and Practice	Knowledge	Knowledge and Practice	Knowledge	Knowledge and Practice
n	17		23		47		87	
Check the RDT expiration date	76.5	53.8	87.0	90.0	74.5	74.3	78.2	75.0
Begin by putting on gloves	88.2	80.0	100.0	78.3	100.0	80.9	97.7	80.0
Hold RDT horizontally	70.6	75.0	73.9	100.0	66.0	83.9	69.0	86.7
Seat the mother comfortably	82.4	100.0	65.2	100.0	61.7	89.7	66.7	94.8
Clean the finger with disinfectant	94.1	68.8	95.7	95.5	93.6	79.5	94.3	81.7
Discard lancet in security box	76.5	84.6	78.3	77.8	68.1	87.5	72.4	84.1
Use capillary tube correctly	76.5	76.9	82.6	100.0	78.7	83.8	79.3	87.0
Place blood in the first hole marked A	76.5	100.0	100.0	87.0	85.1	85.0	87.4	88.2
Discard capillary tube in the security box	64.7	81.8	73.9	100.0	66.0	87.1	67.8	89.8
Add two drops of buffer solution in the hole marked B	76.5	76.9	87.0	75.0	72.3	82.4	77.0	79.1
Discard gloves in security box	64.7	100.0	82.6	89.5	68.1	84.4	71.3	88.7
Let test sit for 15 minutes	76.5	61.5	91.3	90.5	68.1	78.1	75.9	78.8
Correctly read test results	94.1	68.8	100.0	91.3	87.2	82.9	92.0	82.5
Discard test in security box	47.1	75.0	78.3	88.9	57.4	81.5	60.9	83.0
CHWs who correctly followed all steps	47.1	87.5	47.8	81.8	27.7	92.3	36.8	87.5

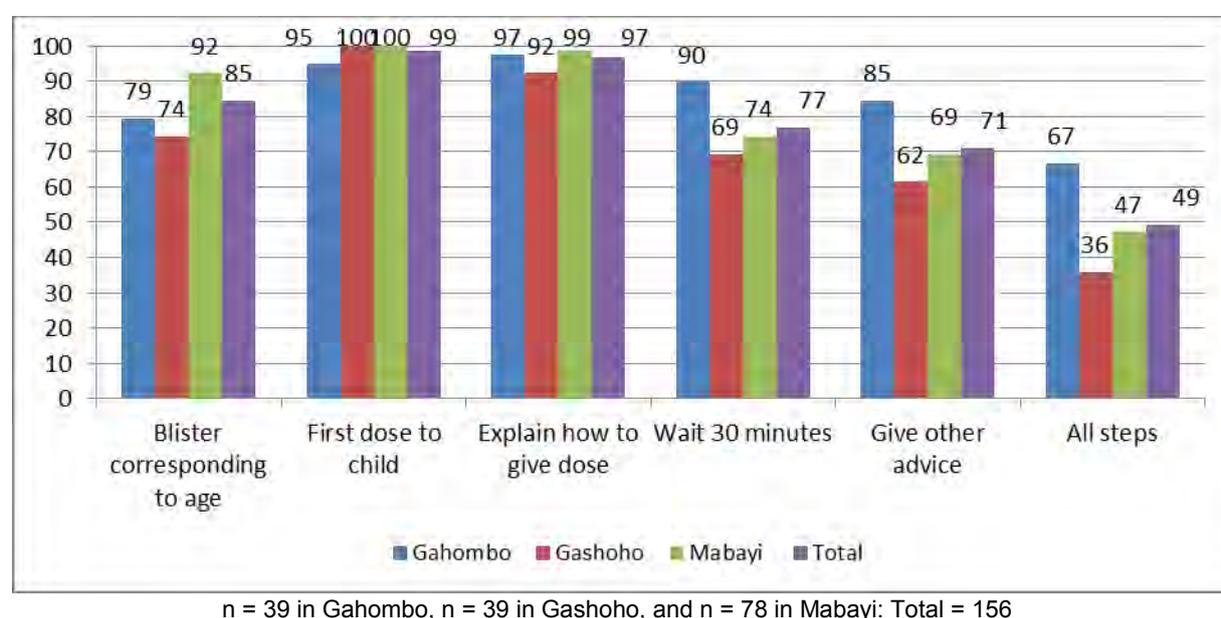
<sup>22</sup> This column refers to CHWs who were observed and who cited the specific RDT step during the interview at home. The denominator for this column is all observed CHWs.

<sup>23</sup> This column refers to CHWs who performed the step among those who were observed and who cited the specific RDT step during the interview at home. The denominator for this column is the number of CHWs who cited the RDT steps during the interview at home among those who were observed (thus, the numerator of the previous column).

Additional information outside the questionnaire indicates that there were changes in the types of tests used, with nuances in the process compared to what they received during training and what is stated in the aide-mémoires they have. This could be the cause of errors such as the number of drops of buffer solution to add and the wait time required before reading the test result. In addition, the average monthly number of cases (eight) per CHW indicates a low frequency of handling the RDT, explaining the low level of mastery of the protocol. This could be related to the fact that observation of CHWs during the consultation is rarely used as a supervision method to correct errors.

### 3.3.4 Treatment

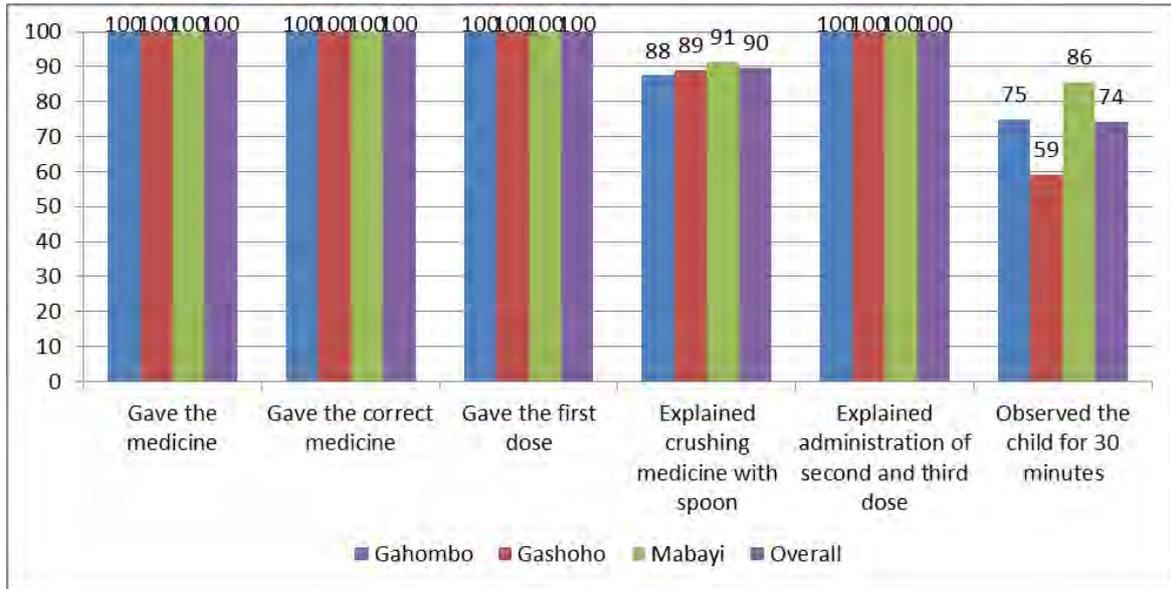
The evaluation investigated CHWs' knowledge about the steps for treating a child who has been diagnosed with malaria. Overall, 49% of CHWs can routinely cite all the treatment steps, as shown in figure 8.



**Figure 8: Proportion (%) of CHWs who know the steps for treating a child (source: interview)**

Figure 9 shows the application of steps during the observed consultation for children who had a positive RDT result and received treatment (37 cases observed of 87 consultations). The steps are studied in greater detail during the observation than in the interview. Results from the practice during the consultation show that the majority of CHWs perform the key steps of treatment.

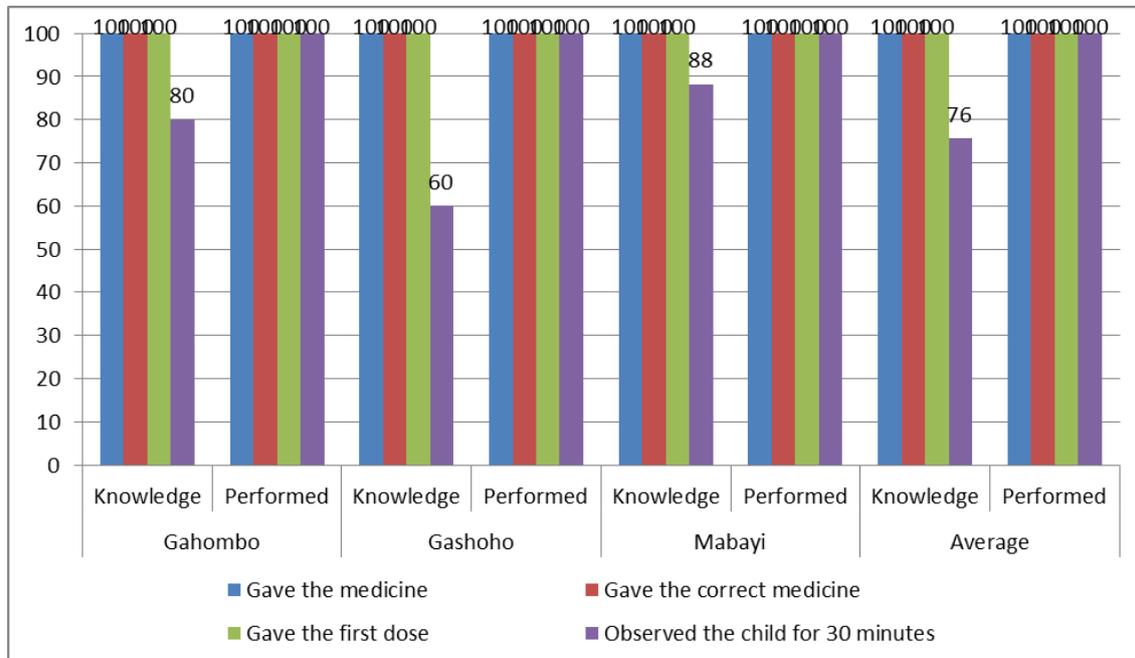
From a practical perspective, for positive RDT cases (n=37), administering the medicine, providing the correct medicines, giving the first dose, and explaining how to give the second and third doses is performed by all the CHWs who were observed. Close to three-quarters (74%) of CHWs observe the child for 30 minutes after administering the first dose, and 72% of CHWs point out to the mothers the importance of finishing the three-dose course of treatment.



n=5 for Gahombo, n=15 for Gashoho, and n=17 for Mabayi, or total n=87

**Figure 9: Proportion (%) of CHWs who correctly follow the steps for malaria treatment (source: observation)**

From figure 10, through a triangulation process, it was noted that all CHWs who know the steps for treatment (during the home interview) performed them 100% during the actual treatment of children (during the observation), which is ideal. “Knowledge” refers to the CHWs who cited the steps during the home interview. In figure 10, performance of the action during an observed treatment of a child suffering from malaria (positive RDT) was compared to knowledge only for those who verbally cited it during the home interview.

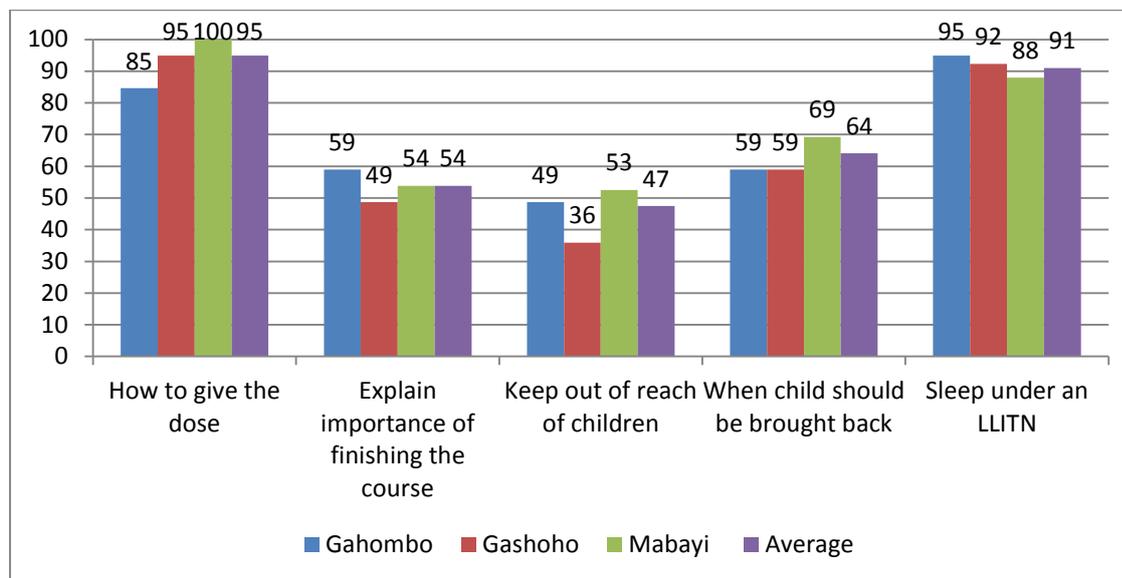


n=5 for Gahombo, n=15 for Gashoho, and n=17 for Mabayi, for a total of n=87

**Figure 10: Proportion (%) of CHWs who know and correctly perform the steps for malaria treatment (source: observation)**

### 3.3.5 Advice

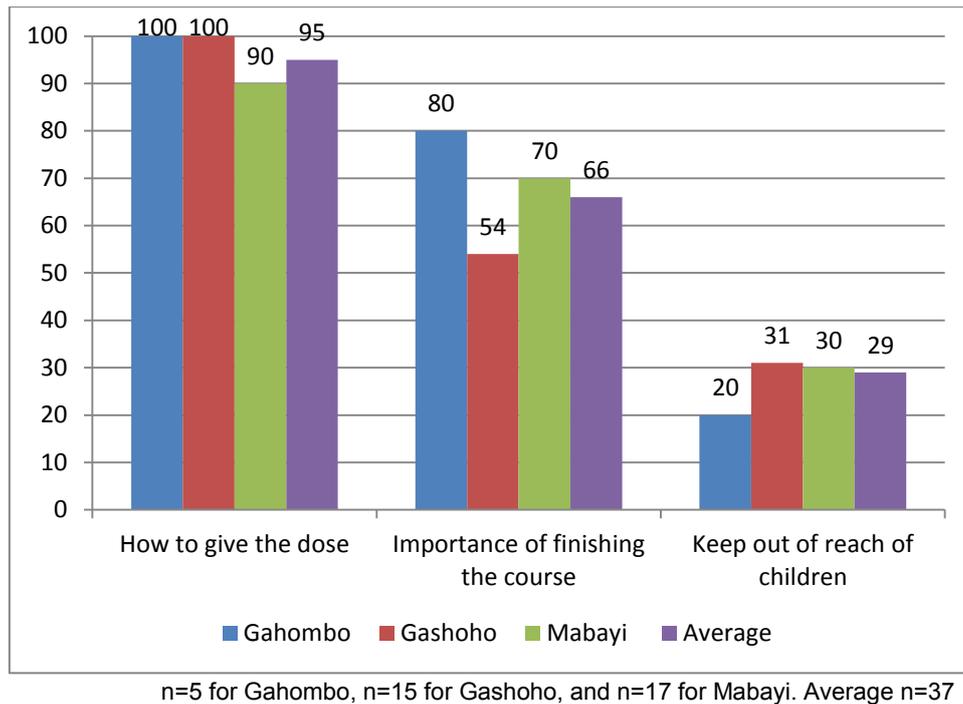
When taking into account the entire package of advice compared with treatment and prevention (figure 11), 95% of CHWs could cite the advice on how to give medicine doses, and 91% know they must give advice on the use of long-lasting insecticide treated nets (LLITNs); a lower percentage (64%) know that they must give advice on the importance of bringing the child back for follow-up.



(n=39 in Gahombo, 39 in Gashoho, 78 in Mabayi, or total n=156)

**Figure 11: Proportion (%) of CHWs who know the advice to be given (source: interview)**

In practice (figure 12), the finding is that 95% of CHWs observed could give advice to mothers of children with diagnosed malaria on how to administer the doses of medicine, which is important. However, other advice related to treatment (for example, the importance of completing the course of treatment and keeping medicines out of reach of children) the majority of CHWs did not give.



**Figure 12: Proportion (%) of CHWs who give appropriate advice at the time of antimalarial treatment (n=37 of 87 observed cases)**

Once again, analysis of the triangulation performed for the CHWs who had cited the advice to give and for whom the children had a consultation and a positive RDT found that 100% of these CHWs actually gave this advice.

**Table 14: Proportion (%) of CHWs who gave advice related to treatment among those who know the advice (n=37 observed cases with positive RDT)**

Advice	%	
	Knowledge	Advice given
How to give the dose	67.6	100
Importance of finishing the course	27.0	100
Keep medicines out of children’s reach	8.1	100

Table 14 points out that the knowledge gaps result from the fact that advice is not given.

To assess the communication of these advice messages, during the exit interviews the percentage of mothers who retained the message was analyzed from among those who received the message. A triangulation analysis was performed for the advice on treatment (table 15) and the advice on changes in the child’s condition and prevention (table 16).

**Table 15: Proportion (%) of mothers of children with a positive RDT who retained the instructions on how to prepare and give the antimalarial medicines**

	Overall n=37	
	Advice given to the mother	Advice retained by the mother
Give the medicine once daily	100	100
Give the medicine with a spoon, after crushing and mixing it with water	86.8	100
Give the medicine at the same time as the first dose	100	100
Give the medicine for three days	86.8	100
Finish the course of treatment	55.3	100
Keep medicines out of reach of children	31.6	100

All the mothers who received advice on preparing and administering medicines retained all of it (100%). Thus it appears that the communication of messages on administration is effective. As already noted, the CHWs did not all give the advice on the importance of finishing the course of treatment and keeping medicines out of reach of children, but for those who did, all the mothers remembered the message.

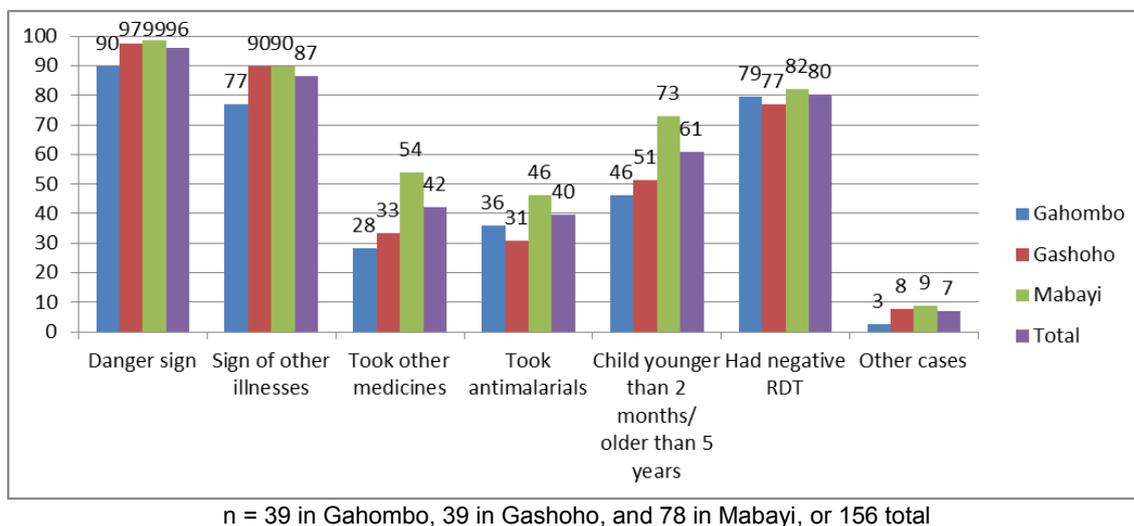
When performing triangulation between the observed cases and the exit interviews (table 16), 81% of CHWs advised the mothers to bring the child back if his or her condition worsens, for example. Overall, 93% of mothers retain what they actually received as advice in the consultation with the CHWs. Regarding other advice about when to bring the child back, the messages were not clearly understood by the mothers. In terms of the advice to sleep under an LLITN, 100% of CHWs provided it and 100% of mothers retained it. This is likely because sensitization about the use of LLITNs is strongly supported by other communication channels such as radio messages, educational sessions on health in HCs, awareness-raising sessions led by CHWs, and so on.

**Table 16: Proportion (%) of mothers who retained the advice given by CHWs during the consultation for observed positive cases**

Advice	Average n=37	
	Advice given to the mother	Advice retained
Bring child back if his or her condition worsens	81.1	93.3
Bring child back if other signs appear	37.8	71.4
Bring child back if his or her condition does not improve in 24 hours	27.0	60.0
Bring child back if his or her condition does not improve after three doses	73.0	88.9
Bring child back if fever persists	51.4	36.8
Bring child back if a rash develops	10.8	75.0
Sleep under an LLITN	100.0	100.0
Pay attention to hygiene in the home	86.5	81.3
Know the danger signs	64.9	95.8
Apply damp cloth in case of fever	51.4	78.9

### 3.3.6 Referral and Counter-Referral

In general, CHWs know the reasons for a referral, such as danger signs and a negative RDT (figure 13), but fewer CHWs cited other reasons for referral.



**Figure 13: Proportion (%) of CHWs, by their knowledge of reasons for transferring children**

Among the 24 HCs visited, 88% of respondents stated that the referrals made by the CHWs were done appropriately. A review of the CHWs' referral forms and patient registers for the 156 CHWs surveyed showed that close to 78% referred all children presenting danger signs. Although all children with danger signs should be referred to the HCs, the evaluation found that about 22% of CHWs do not systematically refer all children presenting a danger sign.

During the FGDs, when questioned about whether the mother had ever brought a child to a CHW who referred him or her to the HC, some mothers say they had taken their child to a CHW and that they were referred because of a negative RDT but that the child was greatly suffering; for others, the child had malaria and was referred because he or she presented danger signs.

After having been referred to the HC and then returning home, the mother should give the counter-referral form to the CHW to show what was done at the HC. The evaluation found that very few counter-referral forms sent from HCs to the CHWs via the mothers were recorded: only 25%. The mothers do not routinely bring the counter-referral forms back to the CHWs.

### 3.4. Capacity of the System for and Support of PECADOM Implementation

The evaluation of systemic capacity for and support of PECADOM implementation is based on the following aspects: (a) coordination and development of policies behind the PECADOM strategy; (b) capacity building; (c) supervision, monitoring, and quality control; (d) medicine management; (e) communications and social mobilization; (f) the monitoring and health information system; and (g) community support and CHW motivation.

### **3.4.1. Coordination and Development of Policies**

The MSPLS, through the PNILP and in collaboration with its partners, coordinates implementation of the PECADOM strategy. By contrast, a technical committee that should be operational and providing technical coordination is not because it has not been set up yet. All levels of the health system (central, intermediate [BPS and BDS], and peripheral [HCs]) participate in the monitoring and supervision of PECADOM implementation.

In terms of policy development, only the MDG Acceleration Framework includes iCCM (p. 64, point B2.1.1: “Train CHWs from 10,757 sous-collines in the case management of diarrhea, pneumonia, and malaria”), and no other strategy includes PECADOM. To overcome this lack of reference to PECADOM in the national strategic plans, a strategy document and a procedures manual on community health were developed and signed January 30, 2012, by the Minister of Public Health and the Fight against AIDS. The role of the DPSHA should be pivotal in the coordination of community health activities. According to the procedures manual on community health, the DPSHA should coordinate community health activities from their planning stage to M&E (section 1.3 above). The current situation is that the partners supporting implementation are taking greater initiative than the PNILP and DPSHA. DPSHA and PNILP should lead the way in taking ownership of the strategy by providing leadership in the implementation and monitoring of activities so that the implementation partners can support them with complementary activities.

### **3.4.2. Capacity Building for CHWs**

#### ***Equipment***

The evaluation found that all CHWs have a kit containing supplies, equipment, algorithms, and an aide-mémoire for malaria case management for children. However, since these kits were provided by different partners, they are not identical. For example, in Mabayi (table 17) the CHWs did not have bicycles or mobile phones in their kits because the partner did not provide them. Regarding other components of the kit, all the CHWs have the boxes, and they have the other equipment in varying proportions.

**Table 17: Proportion (%) of CHWs surveyed according to type of equipment possessed**

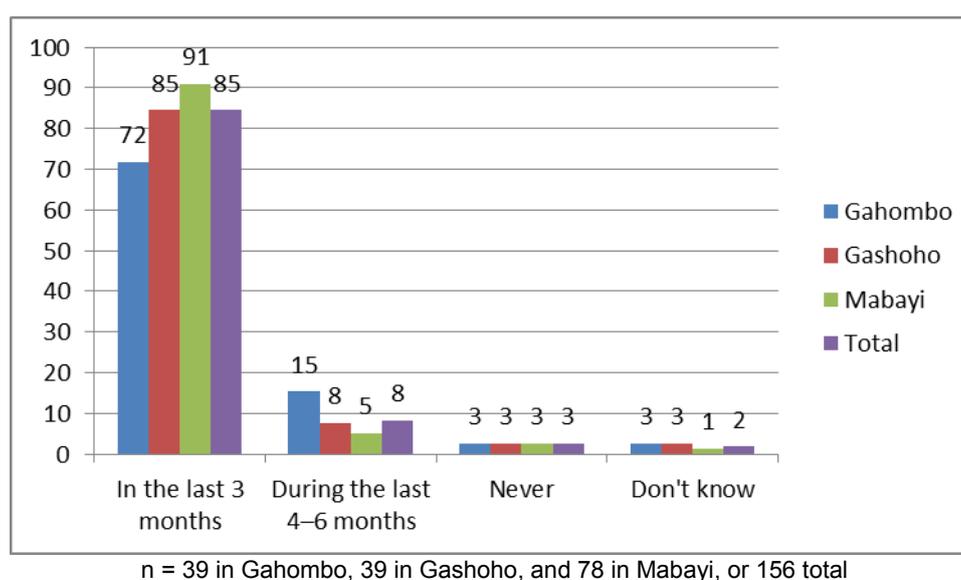
<b>Equipment</b>	<b>Gahombo n=39</b>	<b>Gashoho n=39</b>	<b>Mabayi n=78</b>	<b>Overall n=156</b>
Box	100	100	100	100
Timer for RDT	100	97	94	96
Bicycle	100	100	0	50
Telephone	100	97	0	49
Jerry can	97	95	91	94
Cup	90	97	97	96
Spoon	97	97	99	98
Umbrella	97	97	95	96
Satchel	97	97	97	97
Patient register	100	90	99	97
Referral form	100	97	97	98
Flashlight	90	80	92	89

## Training

Before making the CHWs operational in their respective *sous-collines*, preservice training sessions were organized to train them in malaria case management for children. All CHWs attended preservice training, and 67% (56% in Gahombo, 67% in Gashoho, and 73% in Mabayi) say that they participated in additional training. However, information from partners and HCs says that all CHWs attended training on PECADOM scale-up: a three-day refresher training session for CHWs from the districts of Gahombo and Gashoho and a two-day refresher training session for the CHWs from Mabayi district. Some CHWs would have answered no to this question in the hopes that a negative response would enable them to receive additional training.

### 3.4.3. Supervision, Monitoring, and Checking the Performance Quality of CHWs

Findings revealed that supervision of CHWs is inadequate and is not conducted regularly (figure 14). Specifically, 85% of CHWs received at least one supervision visit during the last three months (72% in Gahombo, 85% in Gashoho, and 91% in Mabayi). In this group, 45% received a supervision visit during the three months preceding the evaluation (23% in Gahombo, 44% in Gashoho, and 56% in Mabayi). This is an encouraging indicator because it could quickly attain the standard that each CHW should receive at least one supervision visit per month during the strategy's first three months and one visit per quarter afterward. Because the strategy is no longer in its first three months, quarterly supervision visits are sufficient. Three individuals per HC (the TPS, the nurse in charge, and his or her assistant) might participate, taking turns, in supervision. Given the number of CHWs to supervise, the TPS is unable to supervise all of them and perform other activities. Supervising CHWs is not an easy task with reduced staff, based on statements from HC managers: there are approximately 14 PECADOM CHWs per HC (varying from 9 to 31 per HC in Gahombo, from 6 to 25 in Gashoho, and from 3 to 29 in Mabayi), as well as other CHWs assigned other tasks who must also be supervised.

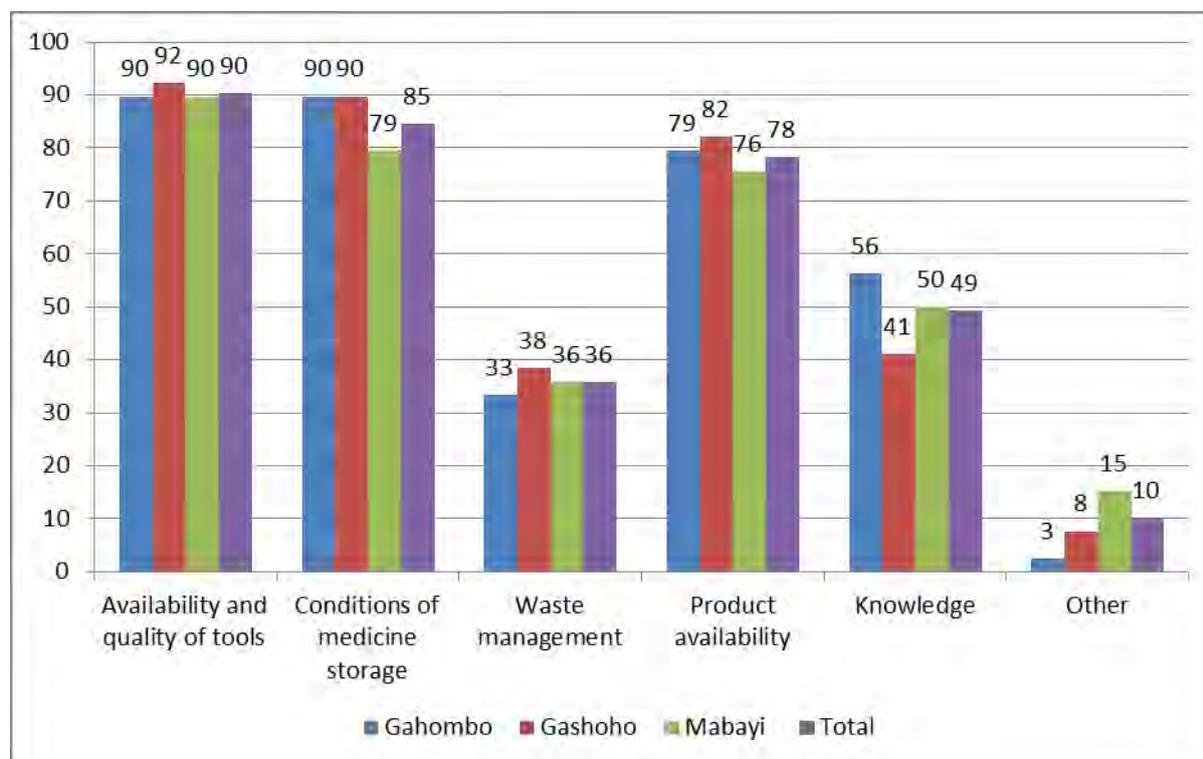


**Figure 14: Proportion (%) of CHWs supervised by HC providers**

Supervision is part of the current vertical approach in the health system: the HCs should be supervised by the BDSs, which should be supervised by the BPSs, which should be supervised by the central level. However, findings from interviews noted that PECADOM supervision is not conducted at all levels. The provincial level has not played a role in supervision. In interviews with BPS officials, only one confirmed having organized a supervision visit for a CHW accompanied by an HC staff member in charge of PECADOM.

Among other problems encountered by the HC managers, this irregular supervision is partially caused by lack of resources, particularly to cover transportation expenses so that all CHWs can be supervised in their homes. During the interviews, the district heads mentioned insufficient staffing as a problem for PECADOM. Suggestions from HC managers on improving PECADOM included compensation of supervisors for travel and communication expenses.

HC supervisors analyze register data to evaluate CHWs' skills. To guide the supervision of CHWs, managers from 17 of 24 HCs say that they use a checklist and that the topics receiving the most supervision are the availability and quality of maintenance tools, medicine storage conditions and management, waste management, availability of supplies, availability and storage of equipment, cleanliness, filling out data collection tools, and knowledge (figure 15). It should be noted that case management is not cited among the supervision topics. According to CHWs, supervision topics overlap with those mentioned by health managers. During supervision, CHWs benefit from advice for correcting and resolving the noted errors.



**Figure 15: Proportion (%) of CHWs mentioning various supervision topics**

Although supervision visits do not occur regularly, 100% of HCs organize monthly meetings. Among the CHWs surveyed, 94% participated in an HC meeting in the month preceding the

survey (92% in Gahombo and Gashoho and 96% in Mabayi). An agenda was developed for the monthly meeting that seeks to cover the various topics listed in table 18. According to the statements of the surveyed CHWs, this model is not very useful; discussions about problems that arise are more common during these meetings (79%), and the meeting is not used as an opportunity to strengthen practices and knowledge.

**Table 18: Proportion (%) of CHWs based on their statements on the topics addressed in meetings**

Topics addressed	Gahombo n=39	Gashoho n=39	Mabayi n=78	Average n=156
Direct observation of consultation	38	44	46	44
Training session	23	26	49	37
Reviewing reports	59	51	67	61
Ordering/restocking	23	56	40	40
Discussions about problems that arise	79	82	78	79
Other	3	13	14	11

#### **3.4.4. Medicine Management**

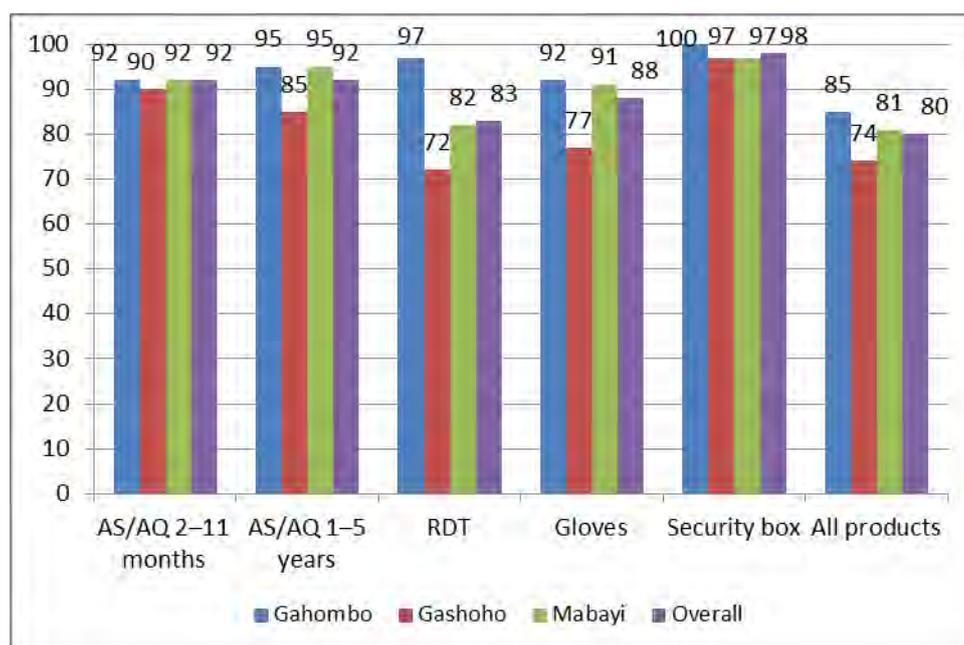
Community-based malaria case management not only requires the skills and availability of CHWs but also greatly relies on continuous availability of medicines for CHWs. For this purpose, a mechanism was set up so HCs could order on a monthly basis to avoid stock-outs. The CHWs have stock cards for each type of product where they record their inputs, outputs, expiration date, and available quantity in stock. They also have order forms where they record consumption and available quantities of stock, which provides the basis for HCs to calculate quantities to provide to CHWs. In December 2012, the average minimum and maximum stock for each type of product was estimated for the districts of Gahombo and Gashoho (table 19). For the Mabayi district, the minimum and maximum stocks were determined for each CHW. The HCs should replenish the stock for each CHW based on the amount consumed during the past month.

**Table 19: Minimum and maximum stocks of products for the districts of Gahombo and Gashoho**

	Gahombo		Gashoho	
	Minimum stock per CHW	Maximum stock per CHW	Minimum stock per CHW	Maximum stock per CHW
AS/AQ 2–11 months	1 blister	3 blisters	1 blister	4 blisters
AS/AQ 1–5 years	1 blister	3 blisters	3 blisters	20 blisters
RDT	1 test	7 tests	3 tests	30 tests

**Availability of Products at the Time of Investigators' Visit**

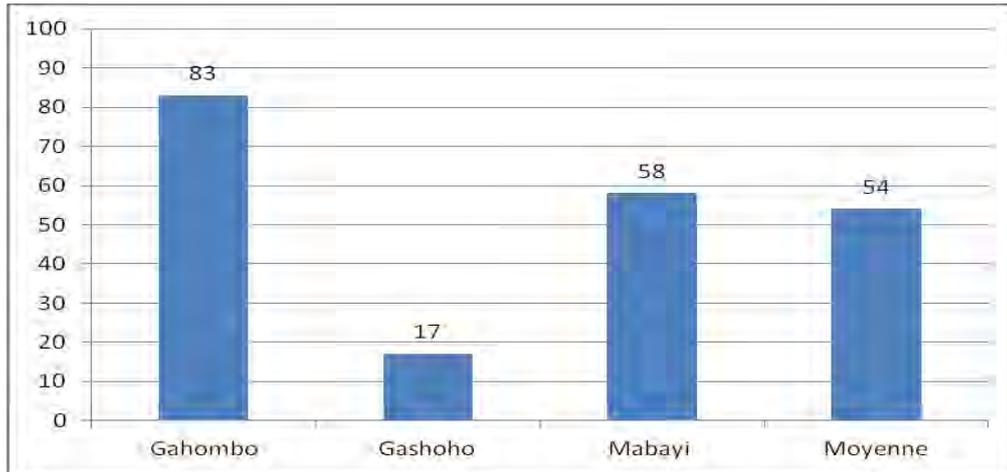
Product availability is a critical component for the successful management of PECADOM. Overall, the CHWs state (in FGDs) that they are not short on medicines because they resupply at the HCs any time they risk running out of stock. All five products were available for 80% of CHWs surveyed (figure 16). The others did not have one or more products. With 20% of CHWs not having all the products in stock, this means that one in five CHWs was not ready to treat children who might seek care. The figure also shows that the availability of each product for the CHWs varies from one product to another. The minimum and maximum stock thresholds have not been observed.



n = 39 in Gahombo, 39 in Gashoho, and 78 in Mabayi, or 156 total

**Figure 16: Proportion (%) of CHWs with five products available the day of the survey (n=156)**

By contrast, just over half the HCs (13 of 24, or 54%) had all five products in stock the day of the survey (83% in Gahombo, 17% in Gashoho, and 58% in Mabayi) (figure 17). In this context, 46% of HCs were not able to supply the CHWs with all the products.



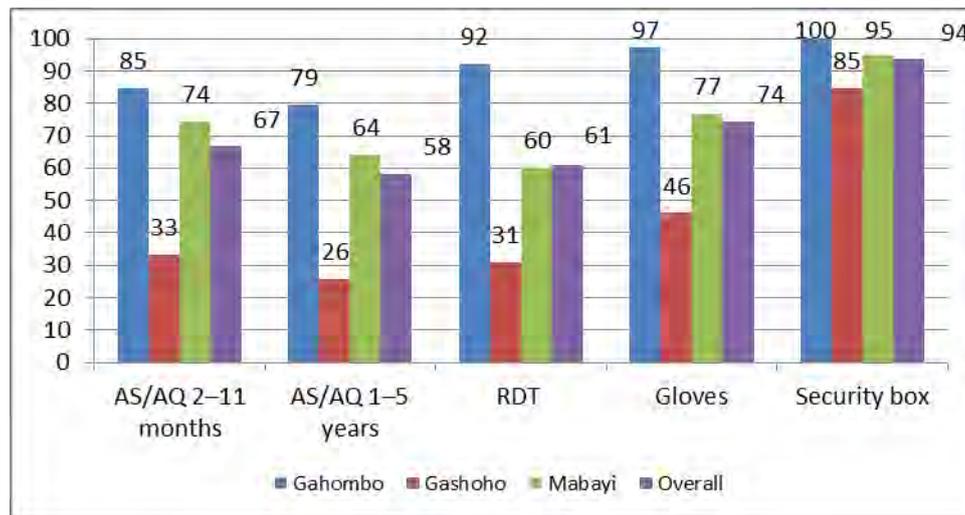
**Figure 17: Proportion (%) of HCs with all five products available the day of the survey (n=24)**

Concerning district pharmacies, none of the three had all five products in stock the day of the survey.

**Stock-outs**

The absence of any stock-outs is a solid indicator to show the availability of products over a specified period. The CHWs depend on the HCs and district pharmacies to resupply their stocks; therefore, continuous availability must be ensured for products at these levels.

Fewer CHWs have no stock-outs (no days with stock-outs) in the Gashoho district for all products, as shown in figure 18.



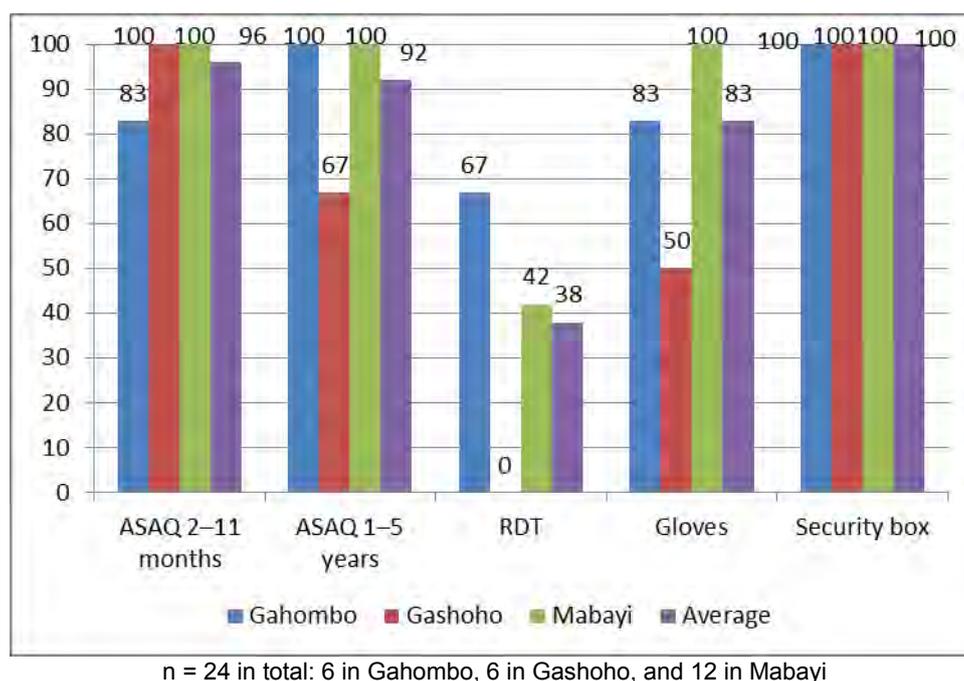
n = 39 in Gahombo, 39 in Gashoho, and 78 in Mabayi, or 156 total

**Figure 18: Proportion (%) of CHWs without a stock-out during the last six months**

This finding corroborates the situation presented in figure 19, where even at the Gashoho HCs, all experienced an RDT stock-out of at least seven days during the last six months.

During the interview with CHWs, they explained that when they are experiencing a stock-out, they refer patients to the HCs or to other CHWs. Table 20 shows that the district pharmacies did not experience a stock-out for AS/AQ products, but the availability of other products was not ensured. At the time of the survey, there was a countrywide RDT stock-out.

In theory, the district pharmacy is managed by just one person, and when he or she is unavailable, the pharmacy is closed. For example, in Gashoho, the pharmacy manager was away during the evaluation period and nobody replaced the manager. Hence, the pharmacy remained closed, which can cause stock-outs in the HCs, and, consequently, for the CHWs, since their source for resupplying (HCs) has no products for them.



**Figure 19: Proportion (%) of HCs without stock-outs of over seven days over the last six months for various products**

**Table 20: Number of district pharmacies with no stock-outs longer than seven days during the last six months (n=3)**

Product	Gahombo	Gashoho	Mabayi	Overall
AS/AQ 2-11 months	1	1	1	3
AS/AQ 1-5 years	1	1	1	3
RDT	0	0	0	0
Gloves	1	0	1	2
Security box	1	1	1	3

### *Method and Frequency of Resupply*

The majority of CHWs resupply their stocks based on their specific needs, despite the planned requisition mechanism anticipated during the monthly meetings. Hence,

pharmaceutical products are not regularly resupplied for 82% of CHWs (95% in Gahombo, 67% in Gashoho, and 83% in Mabayi). Only 10% of the CHWs were supplied on a monthly basis (0% in Gahombo, 28% in Gashoho, and 6% in Mabayi).

The CHWs go on their own to pick up medicines at the HCs by foot for 31% of CHWs surveyed in Gahombo, 46% in Gashoho, and 96% in Mabayi, or by bicycle for 62% of CHWs surveyed in Gahombo, 51% in Gashoho, and 0% in Mabayi. Some CHWs do not use bicycles because they can take shortcuts on foot that are inaccessible to bicycles. Also, most of the female CHWs do not know how to ride a bike.

The majority of CHWs receive help to determine what quantities to order when they resupply pharmaceutical products at the HCs, either by the HC nurse in charge or by the HC pharmacy managers. The percentage of CHWs who determine the quantities of products to order themselves when they go to resupply is 17% (18% in Gahombo, 26% in Gashoho, and 12% in Mabayi). The HCs calculate the quantities they need to resupply the CHWs based on average monthly consumption or consumption (quantities used) of the previous month only.

Overall, the CHWs are equipped with job aids such as registers, referral forms, stock cards, and requisition forms. However, the fact that some CHWs experienced stock-outs means that the implemented procurement system is not followed. The proportion of HCs not having all products in stock has an impact on resupplying CHWs and makes it difficult to comply with the system in place. The HC pharmacies are the only source of products for the CHWs. The delivery of medicines at the community level is an integral part of the national supply chain system (CAMEBU–HD–HC) and is one of PECADOM’s key strengths. This ensures the sustainability of supply and guarantees that available products comply with MSPLS standards; however, close monitoring remains crucial.

### ***Stock Management by CHWs***

It is important that the cards are completed to determine product consumption and availability and to correctly determine needs. All CHWs use the stock cards for each product. Reviewing the CHWs’ stock cards indicates that the physical count equals the count on the card (theoretical stock) for 65% of the CHWs surveyed. Table 21 shows the proportions of CHWs whose physical count equaled the count on the card.

**Table 21: Proportion (%) of CHWs whose physical stock equals theoretical stock**

<b>Product</b>	<b>Gahombo n=39</b>	<b>Gashoho n=39</b>	<b>Mabayi n=78</b>	<b>Overall n=156</b>
AS/AQ 2–11 months	95	95	95	95
AS/AQ 1–5 years	97	95	95	96
RDT	95	87	87	89
Gloves	92	69	86	83
All the products	87	56	59	65

### ***Product Storage by CHWs***

The medicines must be stored properly to ensure their quality. A CHW should keep the products in a sealed box, in a clean and dry place.

The majority of CHWs surveyed (81%) store their products properly in the lockable boxes provided to them (87% in Gahombo, 90% in Gashoho, and 74% in Mabayi).

Regarding cleanliness, the evaluation team noted that the box for storing pharmaceutical products was clean and dry for 96% (97% in Gahombo, 92% in Gashoho, and 96% in Mabayi).

Among the surveyed CHWs, 17 have experienced expired products, or 11% (8% in Gahombo, 0% in Gashoho, and 18% in Mabayi). The expiration date should be monitored during supervision visits.

Management of medicines is relatively good overall; the CHWs correctly complete the tasks that they are responsible for in the procurement chain. The problem lies in the failure to comply with the resupply mechanism and in the availability of products in the upper echelon of the supply chain.

### **3.4.5. Communication and Social Mobilization**

This section presents the best practices as well as limitations affecting communication and social mobilization for the introduction and implementation of PECADOM in the pilot HDs. Communication of the PECADOM strategy in the pilot HDs was primarily driven by a booklet for CHWs and a picture box (used by 61% and 42% of CHWs, respectively).

The CHW booklet includes messages that the CHWs must present to the community; these are many and varied, notably the signs of malaria and its prevention, seeking care for malaria quickly, and what a CHW should do for a patient with fever. The messages are delivered during meetings organized by either government or health officials, or during sensitization visits conducted by CHWs. The meetings organized by government officials are the information channel used most often for keeping people informed of developments concerning PECADOM, according to 92% of surveyed CHWs (95% in Gahombo, 92% in Gashoho, and 90% in Mabayi). Meetings organized by health officials are another communication channel (6% of CHWs surveyed).

### **3.4.6. Monitoring and Health Information System**

Activities carried out by the CHWs are monitored through reports (on medicine management and carbonless copies from the register) sent to the HCs, who in turn are responsible for compiling and sending them to the HD. Data on medicine management is also sent and compiled. In the Gashoho and Gahombo districts, the data are entered into a simplified database by focal points for malaria or by health information system managers. However, for Mabayi district, data are entered into the database by Concern staff. The data are used to write reports and deal with the following variables—

- Number of children seen by the CHW
- Number of children with danger signs
- Number of children seen within 24 hours of the onset of fever
- Number of children seen after 24 hours of the onset of fever
- Number of positive cases
- Number of negative cases

- Number of children treated
- Number of children treated within 24 hours of the onset of fever
- Medicine management
- Number of supervisions conducted
- Number of meetings held

The majority of CHWs (74%) send the monthly report to the HC during the first week of the following month (59% in Gahombo, 54% in Gashoho, and 91% in Mabayi); 19% say they send them weekly, and 7% disregard the set timelines for sending them. Therefore, the deadlines for sending reports are not always met.

The weekly reports are part of surveillance, which is done each week for notifiable diseases, including malaria. This could be the cause of some confusion with the monthly report for some CHWs, as indicated in their responses to questions about the reports. Generally, the nurses in charge at the HCs should compile all data on positive malaria cases diagnosed by CHWs after collecting the information by telephone. Some CHWs send it written on paper, especially when the telephone does not work, but the weekly report does not replace the monthly report.

The quality of these data, with its noncomputerized processing at the HC level, is compromised by potential human errors in manual calculations when compiling data from CHWs' registers. In addition, the administrator has not provided the management and administrative system for the database with a protection and security mechanism, making access possible for anyone with access to a database computer.

Moreover, taking ownership of the data is still weak. The database in the Mabayi district is still managed by the funding partner, while the databases in the districts of Gashoho and Gahombo are managed by health information system managers who perform the data entry. However, at the district level, it is not possible to check the consistency with the primary data from the CHW registers. This database is not incorporated into the overall health information system for other services. However, it was used for this evaluation.

The data on PECADOM are available, but analysis of these data and their use for decision making by officials at the HC and district levels are still weak.

### **3.4.7. Community Support and CHW Motivation**

All CHWs state that community members do not get involved in supporting them. In effect, among the CHWs questioned, 80% say they receive no support from the community (67% in Gahombo, 87% in Gashoho, and 85% in Mabayi). To a limited extent, some said they received verbal encouragement (20%). Of course it is intangible, but it is important for CHWs who are working voluntarily in PECADOM.

During the FGDs, community leaders stated unanimously that the CHWs provide care for children and that though the community appreciates the CHWs, they receive no support in return from the community. Some say that community members are poor and cannot do anything and that instead they are the ones in need. In addition, COSA members provide moral support through meetings with CHWs every two months to assess, discuss, and identify the strengths and weaknesses of program execution.

As with the other FGDs, the mothers in FGDs state that community members provide no support to the CHWs because they live in precarious conditions and the CHWs are paid somewhere, even if they agreed to volunteer.

However, all groups recognize that the CHWs need support through financial or material motivation. Health officials have indicated during the FGDs that among the actions to take to improve PECADOM, the CHWs must be given an incentive. *“The CHWs must be supported (wage income so they can buy soap, for example),”* the CHWs report. Some community leaders say: *“The HCs must provide financial support for the CHWs.”*

Support and incentives for CHWs is a challenge to overcome for the sustainability of the iCCM strategy. This was also the main challenge identified in a study<sup>24</sup> conducted in 59 countries that have implemented iCCM, published by WHO in November 2011.

### **3.5. Costs of PECADOM Implementation**

This section presents the costs incurred in the design and implementation of PECADOM, cost projections as well as funding needs for its expansion or its scale-up (initially) and the possible integration of other childhood illnesses, namely diarrhea and pneumonia, afterward. The various costs generated by the analysis are as follows:

- Overall cost (recurrent and start-up) for PECADOM as it is implemented now
  - *Recurrent costs for PECADOM implementation per child under five*
  - *Recurrent and start-up costs for PECADOM per CHW*
- Overall cost (recurrent and start-up) projected for scale-up of PECADOM
  - *Projected recurrent costs per child under five*
  - *Projected recurrent and start-up costs per CHW*
- Overall cost (recurrent and start-up) projected for scale-up of iCCM (integrated package: diarrhea, pneumonia, and malaria)
  - *Projected recurrent costs for iCCM implementation per child under five*
  - *Projected recurrent and start-up costs for iCCM per CHW*

These costs were calculated automatically or generated by the iCCM Costing and Financing Tool, designed by MSH.<sup>25</sup>

This calculation tool incorporates general data into its operations, such as the prevailing inflation rate in Burundi, the population of Burundi, the country’s average rate of annual growth, the salary increase rate, the percentages of certain population groups (particularly, children under five), etc.

Costing using this tool for malaria case management (initially) and the two other childhood illnesses (diarrhea and pneumonia, through an integration process later) is based on two different scenarios:

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<sup>24</sup> WHO Bulletin 2012;90:183–190.

<sup>25</sup> <http://www.msh.org/resources/integrated-community-case-management-costing-financing-tool>.

1. Calculation of the recurrent cost of PECADOM in the pilot districts and calculation of projected costs for its geographic scale-up
2. Calculation of the projected recurrent cost of introducing a new iCCM program

### **3.5.1. Cost of PECADOM in the Pilot Districts**

The cost to implement PECADOM in the three pilot districts was calculated based on data on the activities and costs collected during the survey as well as from the various MSPLS departments or collected by various partners. This calculation assumption is based on existing data for PECADOM in the three pilot districts. The required number of CHWs to scale up the current coverage is just one unit per *sous-colline*, without taking any other factors into consideration.

Based on the assumptions mentioned previously (section 2.2.2) and the various data collected for this purpose, the current costs were determined for fiscal year 2013, as shown in table 22.

**Table 22: Current cost for PECADOM implementation**

	2013	
	USD	BIF
Recurrent costs for the year	283,485	436,283,762
Start-up costs for the year	210,899	324,574,011
Overall cost for PECADOM for the year	494,385	760,857,773
Average recurrent cost per child (2–59 months)	3	4428
Average recurrent cost per CHW	394	606,792
Start-up costs per CHW	283	435,825

The recurrent costs, which constitute more than 50% of this project’s overall costs, are higher than the start-up costs. They mainly comprise medicines and salaries (for health staff covered by the Government of Burundi and salaried staff from partner organizations) as well as other associated expenses related to this project’s various activities.

### **3.5.2. Projected Cost of Scaling Up PECADOM**

Scaling up PECADOM is based on the same assumptions as those that prevailed at the project start-up. The projected costs (in BIF) for scale-up based on the assumptions mentioned above are shown in table 23.

**Table 23: Projected costs for expanding PECADOM**

	2014		2015		2016		2017		2018	
	USD	Fbu	USD	BIF	USD	BIF	USD	BIF	USD	BIF
Recurrent costs for the year	660,239	1,016,107,860	1,319,121	2,030,127,462	2,182,094	3,358,243,102	3,252,772	5,006,016,877	4,565,156	7,025,774,801
Start-up costs for the year	75,884	116,784,871	130,309	200,546,051	220,867	339,914,561	196,856	302,961,661	194,144	298,788,107
Overall annual cost for PECADOM	736,123	1,132,892,731	1,449,430	2,230,673,514	2,402,961	3,698,157,662	3,449,629	5,308,978,538	4,759,300	7,324,562,908
Average recurrent cost per child (2–59 months)	3	5,253	4	5,724	4	6,510	5	7,394	5	8,382
Average recurrent cost per CHW	503	773,883	547	842,377	622	957,856	707	1,087,792	801	1,233,025
Start-up costs per CHW	122	187,456	113	174,388	185	284,924	159	244,916	152	233,246

The overall cost of scale-up for this program will rise by more than 100% annually (nearly 550% in five years), and the largest share of this significant increase is caused by the annual increase in recurrent costs, which rise at a rate close to 100% per year (or 591% in five years).

Specific factors for this increase, apart from amounts for medicines, salaries, and other components, are inflation of the various supplies used in implementing this project, changes in the exchange rate of the BIF with foreign currencies (including the USD), the ever increasing costs of training and meetings because of the program's expansion as well as the annual increase in salaries related to the management and supervision of this program.

The average recurrent cost per child (2–59 months) and recurrent cost per CHW should not increase in the same proportions between 2014 and 2018. The increase in average cost per child (2–59 months) was on the order of nearly 60% mainly because of salaries and medicines while the average cost per CHW was 59%. The start-up cost for 2014 is lower than for 2013 because expenses related to some initial activities (such as training of trainers and the purchase of equipment for CHWs) were already made during the first year.

This increase in average recurrent costs (per child and per CHW) is caused by the rising number of children and episodes that the program must cover and the steady increase in the number of CHWs needed to provide care to these children.

### **3.5.3. Projected Costs for the New iCCM Program**

Estimates of costs related to introducing the new iCCM project are based on new assumptions because the care package has not been implemented yet. Some assumptions are the same as for PECADOM.

Based on the assumptions identified in the methodology, the cost analysis for iCCM for children under five gives the calculation of projected recurrent costs shown in table 24. The rate of increase for these costs is 32% between 2014 (the project's start-up year) and 2018.

**Table 24: Projected costs for iCCM implementation**

	2014		2015		2016		2017		2018	
	USD	Fbu	USD	BIF	USD	BIF	USD	BIF	USD	BIF
Recurrent costs for the year	693,385	1,067,118,933	1,376,425	2,118,318,095	2,316,055	3,564,408,516	3,505,987	5,395,714,042	4,988,999	7,678,069,919
Start-up costs for the year	428,567	659,565,115	164,422	253,044,810	209,678	322,694,926	253,737	390,501,272	258,138	397,274,568
Overall cost for iCCM for the year	1,121,952	1,726,684,048	1,540,847	2,371,362,905	2,525,733	3,887,103,442	3,759,724	5,786,215,314	5,247,137	8,075,344,487
Average recurrent projected cost per child (2–59 months)	4	5,517	4	5,973	4	6,910	5	7,970	6	9,160
Average recurrent projected cost per CHW	528	812,733	571	878,970	661	1,016,660	762	1,172,472	876	1,347,503
Projected start-up costs per CHW	321	493,792	143	220,039	176	270,490	205	315,684	202	310,128

The implementation of iCCM will generate considerably higher recurrent costs in 2018 compared with those in 2014. The rise in recurrent costs for expansion of this program, on the order of 460% between 2014 and 2018, is significant. It is the same for the estimated increase in overall cost (264% for the same period), which is also considerable. The factors for this high increase are similar to those for PECADOM expansion, particularly the costs associated with the case management of two additional illnesses and for the ever increasing population. Table 25 shows that the components of recurrent costs, and medicines, which are rising each year, clearly make up the largest share, followed by supervision costs, which are primarily salaries.

**Table 25: Components of recurrent costs**

	2014	2015	2016	2017	2018
Medicines and medical supplies	35%	43%	47%	51%	54%
Management	7%	1%	0%	0%	0%
Supervision	29%	29%	27%	25%	23%
Meetings	22%	22%	21%	20%	18%
Refresher training sessions	5 %	5 %	5 %	5 %	4 %
Other costs	1%	1%	0%	0%	0%

A significant decrease in the start-up cost for this program was also noted during the observation period since this cost will drop to 44.3% in 2018 compared to that of 2014. The change in this start-up cost has a real and significant impact on the relative increase in the projected overall cost for implementation of the iCCM package.

The average recurrent cost per child should undergo a relative increase on the order of 16% between the baseline year of 2014 and the projection year (2018), while the increase in average projected recurrent cost per CHW, which is 29% between 2014 and 2018, would increase by about the same proportions as the increase in salaries, medicines, and other components.

The start-up cost decreases from the first to the second year, but an increase is noted between the second and third year and between the third and fourth year, before dropping in the last year. This is because of the rise in costs for equipment given to the CHWs, whose numbers will increase based on the number of *sous-collines* integrated into the program, year by year.

#### **3.5.4. Funding for This Program in the Pilot Districts and for Scale-up of iCCM**

PECADOM is jointly funded by the Government of Burundi (through the salaries for civil servants who manage and supervise this program at various levels in addition to medicines) and by various partners, particularly USAID through SIAPS and the purchase of medicines by the President’s Malaria Initiative and Concern Worldwide. Scale-up of iCCM (going from 3 HDs in 2013 to 26 HDs in 2018) will incur high expenses that exceed the reported or promised financing from involved partners, as illustrated in table 26. Hence, it is important to analyze these projected costs to plan for and mobilize the funding required for running this program, given that USAID is the only partner that has already confirmed its funding contribution for fiscal year 2014.

**Table 26: Evolution of the funding gap for the iCCM program**

	2014		2015		2016		2017		2018	
	USD	BIF	USD	BIF	USD	BIF	USD	BIF	USD	BIF
<b>Overall cost</b>	1,121,952	1,726,684,048	1,540,847	2,371,362,905	2,525,733	3,887,103,442	3,759,724	5,786,215,314	5,247,137	8,075,344,487
<b>Available funding</b>	513,659	790,520,833	401,483	617,882,562	622,588	958,162,639	873,738	1,344,683,141	1,158,147	1,782,388,724
<b>Funding gap</b>	-608,293	-936,163,215	-1,139,363	-1,753,480,343	-1,903,145	-2,928,940,803	-2,885,986	-4,441,532,174	-4,088,990	-6,292,955,763

Thus, the calculated funding gaps show that the financing needs for iCCM become higher as scale-up is gradually expanded throughout the entire country and as the number of districts involved increases from year to year, as shown in the following table, taking into account donor and NGO commitments and the MSPLS budget, which still covers salaries and a portion of the medicines.

Given that all external funding that may be available is currently unknown (except from USAID for fiscal year 2014), funding for this program comes solely from the Government of Burundi, whose intervention consists of covering salaries for the supervision of program activities at all levels. Even though this is a contribution, it was noted that this government funding is insufficient.

**Table 27: Proportion (in %) of the funding gap for scale-up of the new iCCM program**

	2014	2015	2016	2017	2018
Funding gap for the new program (1)	608,293	1,139,363	1,903,145	2,885,986	4,088,990
Overall cost for the new program (2)	1,121,952	1,540,847	2,525,733	3,759,724	5,247,137
Ratio (1)/(2)	54.2%	73.9%	75.4%	76.8%	77.9%

This government funding amounts to only approximately 20% of the projected cost for scaling up the current program and a smaller portion for scaling up iCCM (starting in 2015), according to table 27.

There is no funding gap for PECADOM implementation for fiscal year 2014 because USAID still contributes to the funding for this year. Accordingly, the Government of Burundi should, in particular, solicit additional external funding for iCCM implementation.

However, funding from UNICEF and the Global Fund (executed by the Executive Secretary of the National AIDS Control Council) was not taken into account in this evaluation. The various funding gap amounts are actually lower than the figures cited above. Moreover, as iCCM progresses over the years, the various amounts for the funding gap for this program should be lower than those cited in the table above because some cost elements for this program, particularly medicine costs, are covered in the MSPLS budgets. For example, a portion of the medicines usually used at the HCs will be used by the CHWs, but it is not easy to estimate the percentage because of an expected rise in demand with iCCM.

### **3.6. Possibility of Expanding the CHW Minimum Package**

#### *Average Number of Children Seen*

Findings from interviews conducted with CHWs noted that the monthly average number of cases treated by a CHW is eight children.

#### *Time Spent on PECADOM*

The average time (in hours) per day spent by the CHW on PECADOM is three hours, based on CHW estimates. This appears incorrect, given the average number (eight) of cases seen per month by CHWs. Time spent at home waiting for possible cases could possibly justify this three-hour period because the CHW must be available anytime, 24 hours a day. The CHWs say that they are all volunteering and spend every day of the week on their work as CHWs because, they say, patients come to them any time.

#### *Opinions on Expanding the Package of Services*

During the FGDs with community leaders, in response to whether they thought the CHWs' scope of work should be expanded so they could treat other illnesses or handle other childhood health issues, they supported "*expanding their training so that they can treat coughs and influenza, worm infestations, diarrhea, and pneumonia and provide primary care.*"

During the FGDs with mothers, they stated that care from CHWs is free and that they are satisfied with the care and its quality, and the CHWs' advice, their availability, and their reception; thus, they trust that the CHWs are able to treat other illnesses such as intestinal worms, influenza, and diarrhea provided they have previously received the appropriate training.

The CHWs themselves say that they want to be trained in the management of other illnesses such as diarrhea, conjunctivitis, worm infestations, and acute respiratory infections. They say

mothers trust them not only for malaria cases but also for other illnesses that they are unable to help with and that must be referred to the HCs.

From the point of view of the BPS, BDS, and HC officials, the CHWs are able to manage other illnesses, notably diarrheal diseases, pneumonia, river blindness, and worm infestations. The central level<sup>26</sup> has already decided to train one CHW per *sous-colline* in the case management of diarrhea, pneumonia, and malaria (10,757 CHWs) to improve the prevention and integrated case management of childhood illnesses (pneumonia, diarrhea, malaria, etc.) at the health facility and community level.

From professionals to community members, everyone believes that expanding the CHW minimal package is indeed possible.

### ***Analysis of Diagnoses of Cases Referred by the CHWs***

To determine whether children under five with pneumonia or diarrhea already come to the CHWs, the referred cases were analyzed to ascertain what diagnoses the CHWs sent to the HCs. All the referred cases could not be analyzed, only those for which the CHWs could produce counter-referral forms. For the referred cases that were analyzed, 17% were diagnosed as “diarrhea” at the HCs, and 6% were diagnosed as “pneumonia”; thus, nearly one-quarter (23%) of these cases are diarrhea and pneumonia cases (table 28). If these CHWs had been trained in managing diarrhea and pneumonia cases, they might have been able to treat them at the community level.

**Table 28: Proportion (%) of diarrhea and pneumonia cases diagnosed at HCs, according to counter-referral forms, in the last three months**

	<b>Gahombo n=109*</b>	<b>Gashoho n=95</b>	<b>Mabayi n=93</b>	<b>Total n=297</b>
% of cases of negative RDTs referred to HCs and diagnosed as diarrhea	16	16	19	17
% of cases of negative RDTs referred to HCs and diagnosed as pneumonia	8	4	4	6

\*Number of counter-referral forms received by CHWs from HCs and analyzed by CHWs

Given the context described above, this finding reinforces the decision already made by the Government of Burundi in the MDG Acceleration Framework document to set up and train one CHW per *sous-colline* to manage the package comprising malaria, diarrhea, and pneumonia. However, strengthening the supervision of CHWs and the medicine procurement circuit are prerequisites.

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<sup>26</sup> MDG Acceleration Framework, point B.2.1.1

### 3.7. PECADOM's Strengths and Challenges

The strengths and challenges drawn from PECADOM implementation at the community actor level can be appreciated through the coverage and quality of care, the capacity of the health system and the beneficiary community to support the strategy.

The CHWs are motivated to continue working as providers of PECADOM and are even prepared to take on other diseases because people often ask them to, although they are not able to do so now. They have gained the community's trust. Despite the encouraging lessons learned, some challenges have been noted and could be barriers to PECADOM. Some of these challenges have been observed elsewhere<sup>27</sup> in other countries that have implemented iCCM, notably CHW motivation, supervision, product availability, and the funding gap.

The lessons learned confirm some of those learned during the AIM evaluation (CHW Assessment and Improvement Matrix)—a tool for measuring CHW program functioning that was conducted in October 2012 (Annex 6).

#### *Matrix of Strengths and Challenges by Objective*

Objectives	Strengths	Challenges
Coverage of care offered	<ul style="list-style-type: none"> <li>• Dropout rate (4%) is low</li> <li>• Access to care within 24 hours of onset of fever among children who were seen is relatively good</li> </ul>	<ul style="list-style-type: none"> <li>• Services provided by the CHWs are still not known by mothers and children's caregivers</li> <li>• Demand for the treatment of other illnesses not provided by the CHWs expressed by community members</li> <li>• The policy of one CHW per <i>sous-colline</i> (CHWs living close to HCs seem to be sought out less than those farther away)</li> </ul>
Quality of care provided	<ul style="list-style-type: none"> <li>• The level of knowledge is relatively good but should be constantly strengthened</li> <li>• Key tasks for treatment are conducted by the CHWs</li> <li>• Level of appreciation of the quality of care provided by CHWs is satisfactory</li> <li>• Communication of messages to mothers is relatively good</li> </ul>	<ul style="list-style-type: none"> <li>• Weaknesses exist in the various practices (diagnosis, treatment, and follow-up of patients) but are greater in knowledge of danger signs and advice</li> <li>• Referral and counter-referral could be improved</li> </ul>

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<sup>27</sup> Bulletin of the WHO, 2012, op.cit.

<b>Objectives</b>	<b>Strengths</b>	<b>Challenges</b>
Health system capacity and support for PECADOM	<ul style="list-style-type: none"> <li>• Clear involvement of the government and its partners in the coordination and financing of PECADOM implementation</li> </ul>	<ul style="list-style-type: none"> <li>• Ownership of the strategy by the program in charge of malaria has not yet achieved the desired level for takeover and sustainability in case of partner withdrawal</li> </ul>
	<ul style="list-style-type: none"> <li>• Technical supervision of CHWs is done at least every three months for more than 80% of CHWs</li> <li>• The monthly meeting is held regularly at the HC</li> </ul>	<ul style="list-style-type: none"> <li>• Supervision does not appear to provide mentoring, given the results in quality of care</li> <li>• No travel for supervision and many CHWs to supervise</li> <li>• Monthly meetings are not maximized, and it appears that the meeting agenda is not followed</li> </ul>
	<ul style="list-style-type: none"> <li>• CHWs are satisfied with their supplies as a motivating factor, but receive no other incentives</li> </ul>	<ul style="list-style-type: none"> <li>• Funding and support from the community for PECADOM is nearly nonexistent (low level of community ownership)</li> <li>• CHW motivation or material encouragement was a constant demand in every conversation</li> </ul>
	<ul style="list-style-type: none"> <li>• Filling out of tools for medicine management by CHWs is good</li> </ul>	<ul style="list-style-type: none"> <li>• Cases of stock-outs, especially at the upper level of the supply chain</li> <li>• Medicine resupply occurs irregularly (no set resupply frequency) despite the planned resupply system of monthly orders</li> </ul>
	<ul style="list-style-type: none"> <li>• The PECADOM monitoring system is based on reporting and management and using a district-level database</li> </ul>	<ul style="list-style-type: none"> <li>• PECADOM monitoring system runs parallel to and outside the NHIS</li> <li>• Database is not protected</li> </ul>
	<ul style="list-style-type: none"> <li>• CHWs have been prepared: training, equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Feedback from HCs to CHWs is not sufficiently recognized and counter-referral rate to CHWs is low</li> <li>• Lack of a communication and social mobilization strategy</li> </ul>
Funding	<ul style="list-style-type: none"> <li>• Partners support the government in PECADOM financing</li> <li>• A cost estimate for the integrated package already exists based on the assumptions used and can be used for advocacy</li> </ul>	<ul style="list-style-type: none"> <li>• A significant funding gap must be filled to scale up PECADOM or the integrated package</li> </ul>

## IV. CONCLUSIONS AND GENERAL RECOMMENDATIONS

### 4.1. Conclusions

PECADOM in the pilot HDs is a strategy that has been implemented despite the noted challenges of start-up and is highly appreciated by providers and beneficiaries who receive treatment for malaria in children. Given the large number of cases treated by CHWs, PECADOM has helped roll back malaria in the community. Overall, the CHWs are able to meet the community's expectations and are even ready to take on more tasks if trained to do so. In short, it has achieved its objectives by—

- Helping reduce geographic inaccessibility (CHWs close to beneficiaries)
- Increasing the number of cases treated within 24 hours of the onset of fever
- Strengthening collaborative relationships between communities and health facilities

Nevertheless, challenges remain, especially in the supervision of CHWs, and require special attention to improve implementation of the strategy or integration of other illnesses. Challenges specifically involve CHWs' low levels for practices compared to the treatment protocol, the knowledge gap that hampers the quality of care, inadequate supervision for CHWs, low motivation for CHWs, and stock-outs at every level. The community would like to have an expanded treatment package. The limitations of the study call for further investigations on the impact of the PECADOM strategy.

### 4.2. Recommendations

Given the results presented here that attest to PECADOM's success but also the related challenges, the following recommendations are made for all health sector stakeholders, in general, and those in community health, in particular—

#### **For MSPLS and its partners:**

#### *1. Recommendations targeting PECADOM bottlenecks right now*

- Analyze and strengthen or redesign the supervision model
- Strengthen the procurement system
- Encourage the operational level to include in-service training for CHWs during monthly meetings
- Analyze the reports on iCCM and send feedback to the BDSs

#### *2. Recommendations targeting iCCM implementation*

- Advocate for the financial contribution of the Government of Burundi: a direct budget line for community health at the HC
- Advocate for the mobilization of additional resources
- Define which MSPLS directorate or unit will coordinate iCCM implementation and create a coordination committee
- Develop an iCCM implementation guide
- Plan for expanded implementation (giving priority to CHWs far from HCs)

- Specify the roles of districts and HCs in CHW management
- Set up a sustainable incentive mechanism, for example, community PBF and community involvement
- Take into account children treated by CHWs when calculating the funding envelope for HCs to generate funds to cover iCCM-related expenses
- Define a communication and sensitization strategy at the community level on the available services
- Identify and quantify the required products and ensure the technical specifications are adhered to in procurement
- Provide preservice training and in-service training for CHWs
- Define the iCCM indicators to include in the NHIS
- Consider mobile technology for sending data (for example, logistics) to improve the timeliness of reporting
- Implement a quality improvement system
- Conduct a study in addition to this evaluation on the impact of PECADOM

#### **For regional health teams and district health teams**

- Strengthen supervision, through consideration of the implemented model and the required resources for providing better supervision for CHWs
- Analyze bottlenecks to avoid stock-outs
- Regularly analyze iCCM data, including product availability and consumption at each level (BDS, HC, and CHW)
- Identify a focal point for community activities for each HC

#### **For HCs**

- Organize and implement supervision according to the defined model
- Analyze the CHWs' reports and identify gaps
- Streamline monthly CHW coordination meetings so they serve to continuously strengthen CHW capacities in case management (in-service training and observation)

## **ANNEX 1: CHW RESPONSIBILITIES ACCORDING TO THE IMPLEMENTATION GUIDE**

- Raise awareness in the community about prevention measures for malaria
- Identify children with danger signs, refer them, and convince the mothers to consult the HC
- Conduct a rapid diagnostic test for children with fever
- Administer medicines to children with a positive RDT
- Advise mothers/family members/caregivers about correct medicine intake
- Raise awareness in the community on the importance of applying a damp cloth at the onset of fever and seeking care early in case of fever
- Ensure follow-up for treated children: adherence, side effects, recovery, etc.
- Correctly fill out the consultation form
- Send monthly reports of treated and referred cases in accordance with the agreed-upon checklist
- Keep the counter-referral forms and help parents follow advice given by the HC
- Participate in monthly meetings organized for CHWs
- Resupply medicines and other supplies as needed
- Partner with the community to resupply medicines
- Store medicines correctly and resupply on time
- Maintain and correctly fill out stock cards

## ANNEX 2: OVERVIEW OF INDICATORS

Indicators	Values			
	Gahombo	Gashoho	Mabayi	Overall
<b>Objective 1: Evaluate the coverage of care for PECADOM</b>				
<i>Process indicators</i>				
1. Average number of children seen by CHWs per month during the last 11 months (September 2012–July 2013) (monitored monthly)	1,260	2,031	2,413	5,704
	5/CHW	13/CHW	8/CHW	8/CHW
2. % of children seen by CHWs within 24 hours of onset of fever in the last 11 months	86	83	78	82
3. % of children under 5 years referred to the HC by CHWs in the last 11 months (compared to the total number of children seen)	53	24	53	43
4. % of cases referred by CHWs that were diagnosed with diarrhea or pneumonia at the HC in the last 11 months (denominator: total number of counter-referrals received)	<ul style="list-style-type: none"> <li>•Diarrhea: 16</li> <li>•Pneumonia: 8</li> </ul>	<ul style="list-style-type: none"> <li>•Diarrhea: 16</li> <li>•Pneumonia: 4</li> </ul>	<ul style="list-style-type: none"> <li>•Diarrhea: 19</li> <li>•Pneumonia: 4</li> </ul>	<ul style="list-style-type: none"> <li>•Diarrhea: 17</li> <li>•Pneumonia: 6</li> </ul>
5. % of CHWs who conducted at least one sensitization visit in his or her intervention area in the last three months	85	80	97	90
<i>Product indicators</i>				
6. % of positive RDTs (in the last 11 months)	52	78	46	59
7. % of children under 5 who had a fever with a positive RDT seen by CHWs within 24 hours of onset of fever and who received correct treatment	95	85	99	92
8. % of served <i>sous-collines</i> where CHWs are working	96%	96%	96%	96%

Indicators	Values			
	Gahombo	Gashoho	Mabayi	Overall
<i>Impact indicators</i>				
<b>Objective 2: Evaluate the quality of care for PECADOM</b>				
<i>Process indicator</i>				
9. % of CHWs who give appropriate advice about prevention, taking the medicines, and what to do if the child's condition does not improve	How to give the doses: 100	How to give the doses: 100	How to give the doses: 90	How to give the doses: 95
	Explain the importance of completing the course of treatment: 80	Explain the importance of completing the course of treatment: 54	Explain the importance of completing the course of treatment: of treatment 70	Explain the importance of completed the course of treatment: 55
	Keep medicines out of reach children: 20	Keep medicines out of reach children: 31	Keep medicines out of reach children: 30	Keep medicines out of reach children: 32
	Bring child back: 59	Bring child back: 59	Bring child back: 69	Bring child back: 64
	Sleep under an LLITN: 95	Sleep under an LLITN: 92	Sleep under an LLITN: 89	Sleep under an LLITN: 91
<i>Results indicators</i>				
10. % of CHWs who had the necessary knowledge about identifying danger signs	38	44	40	40
11. % of CHWs who correctly assess cases of fever	Touches the child: 88	Touches the child: 91	Touches the child: 72	Touches the child: 80
	Checks the pallor of the palms and the conjunctiva: 36	Checks the pallor of the palms and the conjunctiva: 39	Checks the pallor of the palms and the conjunctiva: 53	Checks the pallor of the palms and the conjunctiva: 46
% of CHWs who correctly treat cases of fever	Gives the medicine: 100	Gives the medicine: 100	Gives the medicine: 100	Gives the medicine: 100
	Gives appropriate medicines: 100	Gives appropriate medicines: 100	Gives appropriate medicines: 100	Gives appropriate medicines: 100
	Gives first dose: 100	Gives first dose: 100	Gives first dose: 100	Gives first dose: 100
	Explains crushing medicines: 100	Explains crushing medicines: 92	Explains crushing medicines: 85	Explains crushing medicines: 90
	Explains administration	Explains administration	Explains administration	Explains administration

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Indicators	Values			
	Gahombo	Gashoho	Mabayi	Overall
	of the second and third dose: 100	of the second and third dose: 100	of the second and third dose: 90	of the second and third dose: 95
	Observes child for 30 minutes: 80	Observes child for 30 minutes: 69	Observes child for 30 minutes: 80	Observes child for 30 minutes: 76
	Importance of finishing the course of treatment: 80	Importance of finishing the course of treatment: 54	Importance of finishing the course of treatment: 70	Importance of finishing the course of treatment: 66
12. % of mothers who retain the messages received as advice	Child's condition worsens: 40	Child's condition worsens: 31	Child's condition worsens: 80	Child's condition worsens: 58
	Other signs appear: 20	Other signs appear: 15	Other signs appear: 30	Other signs appear: 24
	Child does not improve 24 hours after taking medicine: 20	Child does not improve 24 hours after taking medicine: 8	Child does not improve 24 hours after taking medicine: 25	Child does not improve 24 hours after taking medicine: 18
	Has not improved after taking third dose: 0	Has not improved after taking third dose: 31	Has not improved after taking third dose: 60	Has not improved after taking third dose: 42
	Child presents a skin rash: 20	Child presents a skin rash: 15	Child presents a skin rash: 5	Child presents a skin rash: 11
<b>Objective 3: Evaluate the system's capacity for and support of PECADOM implementation</b>				
13. % of CHWs with stock cards filled out and up to date	87	56	59	65
14. % of CHWs who store medicines properly in a sealed lockable box	87	90	74	81
15. % of CHWs with no stock-outs for AS/AQ and RDTs during the last 3 months	AS/AQ 2–11 months: 85	AS/AQ 2–11 months: 33	AS/AQ 2–11 months: 74	AS/AQ 2–11 months: 67
	AS/AQ 1–5 years: 79	AS/AQ 1–5 years: 26	AS/AQ 1–5 years: 64	AS/AQ 1–5 years: 58
	Paracheck RDT: 92	Paracheck RDT: 31	Paracheck RDT: 60	Paracheck RDT: 61
16. % of HCs with no stock-outs for AS/AQ and RDTs during the last 3 months	AS/AQ 2–11 months: 83	AS/AQ 2–11 months: 100	AS/AQ 2–11 months: 100	AS/AQ 2–11 months: 96
	AS/AQ 1–5 years: 100	AS/AQ 1–5 years: 67	AS/AQ 1–5 years: 100	AS/AQ 1–5 years: 92

Indicators	Values			
	Gahombo	Gashoho	Mabayi	Overall
	Paracheck RDT: 67	Paracheck RDT: 0	Paracheck RDT: 100	Paracheck RDT: 38
17. Number of district pharmacies without stock-outs for AS/AQ and RDTs during the last 3 months	AS/AQ 2–11 months: 1	AS/AQ 2–11 months: 1	AS/AQ 2–11 months: 1	AS/AQ 2–11 months: 3
	AS/AQ 1–5 years: 1	AS/AQ 1–5 years: 1	AS/AQ 1–5 years: 1	AS/AQ 1–5 years: 3
	Paracheck RDT: 0	Paracheck RDT: 0	Paracheck RDT: 0	Paracheck RDT: 0
18. % of CHWs with all products available in accordance with stock levels and consumption (AS/AQ, RDTs, gloves, security box) the day of the survey	85	74	81	80
19. % of HCs with all products available (AS/AQ, RDTs, gloves, security box) the day of the survey	83	17	58	54
20. Number of district pharmacies with all products available (AS/AQ, RDTs, gloves, security box) the day of the survey	0	0	0	0
21. % of CHWs supervised by HC providers at least one time in the last 3 months	72	85	91	85
22. % of HCs holding monthly coordination meetings with CHWs	100	100	100	100
23. % of CHWs who sent their monthly reports in the last 3 months (for cases and medicines) to the HCs the first week of the month	59	54	91	74
24. % of CHWs who say they received support from their community (gift in kind, money, or encouragement)	33	13	15	20

### **ANNEX 3: LIST OF TOOLS USED IN THE EVALUATION**

1. An individual questionnaire for CHWs (including questions related to costs)
2. A checklist for observation and scoring the mother and CHW interactions
3. A guide for interviews with mothers exiting the consultation
4. A guide for interviews with health facility managers (nurses in charge from HCs/TPS, and PECADOM supervisor (combined))
5. A guide for interviews with the district pharmacy manager
6. A guide for interviews with district heads and the PECADOM supervisor (combined)
7. A guide for interviews with the BPS head
8. An interview guide for focus group discussions with mothers or children's caregivers
9. An interview guide for focus group discussions with community leaders (heads of *collines* and COSA members)
10. An interview guide for focus group discussions with CHWs

#### ANNEX 4: LIST OF HCS VISITED DURING THE EVALUATION

<b>Gahombo HD</b>	<b>Gashoho HD<sup>28</sup></b>	<b>Mabayi HD</b>	
1. Mubogora HC	1. Gisanze HC	1. Buseruko HC	7. Ruhororo HC
2. Muhanga II HC	2. Mirwa HC	2. Rugajo HC	8. Nyarusebeyi HC
3. Rukago HC	3. Kagari HC	3. Rubirizi HC	9. Buhoro HC
4. Gahombo HC	4. Nyagatovu HC	4. Ruziba HC	10. Masango HC
5. Ngoro HC	5. Nyungu HC	5. Rubona HC	11. Ndora HC
6. Gatara HC	6. Kigoganya HC	6. Rutabo HC	12. Butara HC

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<sup>28</sup> For the FGDs with CHWs, the HCs of Bwasare and Gashoho were visited even though they were not part of the initial sample.

## ANNEX 5: DETAILS OF COSTING ELEMENTS

### 1. List of medicines

- AS/AQ 25/67.5 mg
- AS/AQ 50/135 mg
- Rapid Diagnostic Test (RDT)
- Oral rehydration salts (ORS), packet of powder for 1,000 mL
- Zinc tablet 20 mg
- Amoxicillin tablet 250 mg
- Gloves

### 2. List of Equipment and Frequency of Its Replacement

Item	Frequency of replacement (years)
Wooden box	3
Timer for RDT	3
Cup	3
Spoon	2
Telephone	1
Satchel	3
Umbrella	2
Raincoat	3
Pair of boots	2
Flowchart	5
Job aid for using Paracheck	3
Book of requisition forms	1
Register	1
Book of referral forms	1
Bicycle	0
Flashlight	1
Security box	0
Stock cards	1
Timer for pneumonia diagnosis	2

### 3. List of Staff Managing Community Programs (PECADOM and iCCM)

PNILP Coordinator	Ministry of Public Health
PNILP Deputy Coordinator	Ministry of Public Health
PNILP Supervisors	Ministry of Public Health
PNILP Laboratory Technicians	Ministry of Public Health
Director of Supply and Demand for Care	Ministry of Public Health
IMCI Focal Point	Ministry of Public Health
Director of the Promotion of Health, Hygiene, and Sanitation	Ministry of Public Health
iCCM/Neglected Tropical Disease Advisor	MSH
Administrative Manager	MSH
Drivers	MSH
Senior Program Manager	MSH
Training Managers	Concern
Community Mobilization Manager	Concern
Facilitators	Concern
Project Manager	Concern
Monitoring-Evaluation Manager	Concern

### 4. Supervision at the Health District (HD) and Health Center (HC) Level

Health Center (HC)	HC Nurse in charge
	Assistant Nurse
	Public Health Technician
	Nurse
Health District (HD)	Chief District Medical Officer
	Focal Point Supervisor
	Pharmacy Manager
	Health Information System Manager

## ANNEX 6: OCTOBER 2012 AIM EVALUATION

### Methodology

- Discussions with partners and the MSPLS on the “AIM” evaluation tool: CHW Assessment and Improvement Matrix—a tool for measuring CHW program functionality
- A workshop with CHWs, nurses in charge from HCs, TPSs, and the BDS supervisors from Gahombo and Gashoho applying the AIM tool
- Observations of consultations conducted by three CHWs at the Gasorwe and Gashoho HCs
- Interviews with CHWs from the HCs of Gasorwe (Gashoho) and Gakenke (Gahombo) to validate findings from the AIM evaluation
- Analysis of data from recent months

### Analysis:

Strengths	Weaknesses	Proposed actions
<b>Recruitment of CHWs</b>		
<ul style="list-style-type: none"> <li>• CHW recruitment is participatory and involves the community</li> </ul>	<ul style="list-style-type: none"> <li>• All the CHWs are new—they are not drawn from the DPSHA CHWs with other functions</li> <li>• The replacement process is not specified</li> </ul>	<ul style="list-style-type: none"> <li>• Study the difference in workload and motivation between Kayanza/Muyinga and Cibitoke where the PECADOM CHWs were already CHWs</li> <li>• Develop a replacement process and add it to the implementation guide</li> </ul>
<b>Training</b>		
<ul style="list-style-type: none"> <li>• Preservice training for CHWs is good and complete</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of in-service training</li> </ul>	<ul style="list-style-type: none"> <li>• Introduce in-service training sessions during monthly meetings</li> <li>• Ensure that HCs can provide training for replacement CHWs</li> </ul>

Strengths	Weaknesses	Proposed actions
<b>Supplies and equipment</b>		
<ul style="list-style-type: none"> <li>The equipment provided serves as an incentive</li> </ul>	<ul style="list-style-type: none"> <li>Many of the supplies and equipment are not provided or damaged</li> <li>Medicine stock-outs</li> </ul>	<ul style="list-style-type: none"> <li>Reequip CHWs with supplies based on an inventory</li> <li>Improve the requisition system—the problem in Gahombo is the low number of cases, thus, CCM in the HC is insufficient for ensuring that each CHW has a minimum quantity of AS/AQ blisters. The suggestion is to use the maximum-minimum approach and to distribute an amount of blisters to CHWs based on their current stock to fulfill their maximum stock. Maximum and minimum stocks will differ between districts. After distribution, the CHWs will resupply each month to maintain their maximum stock.</li> <li>Support the district pharmacy to enter HC data into CHANNEL and to conduct an analysis on medicine availability at each HC.</li> <li>Establish an analysis team: malaria focal point/NHIS manager and district pharmacist</li> </ul>
<b>Supervision</b>		
<ul style="list-style-type: none"> <li>Monthly meetings held at the HCs</li> </ul>	<ul style="list-style-type: none"> <li>Supervision not frequent enough</li> <li>Monthly meetings not used as supervision</li> </ul>	<ul style="list-style-type: none"> <li>Explore the possibility with the HCs of supporting supervision financially, for example, travel expenses for TPSs</li> <li>Advocate at the MSPLS to cover transportation for the TPSs</li> <li>Consider peer supervision</li> <li>Introduce a monthly meeting agenda to ensure that meetings follow an in-service training approach and add consultation observations as a learning method</li> <li>Provide orientation for supervisors on the checklist and content of the monthly meeting</li> </ul>

<b>Strengths</b>	<b>Weaknesses</b>	<b>Proposed actions</b>
<b>Data</b>		
<ul style="list-style-type: none"> <li>Data available at the HC level because the CHWs bring in their registers each month</li> </ul>	<ul style="list-style-type: none"> <li>The BDS does not use the data</li> <li>Producing reports is insufficient: for example, in the Gashoho district, 92% of HCs sent the report they compiled each month and an average of 90% of CHWs sent their data to the HCs</li> </ul>	<ul style="list-style-type: none"> <li>Develop a database to enter data compiled at the BDS level</li> <li>Complete data on the compiled sheet so it can be analyzed and used at the BDS level</li> <li>Strengthen BDS supervisors' capacities to analyze and use data</li> </ul>
<b>Negative RDT</b>		
	<p>A high percentage of negative RDT cases demotivates CHWs and the community:</p> <ul style="list-style-type: none"> <li>In Gashoho, 26% of RDTs performed were negative</li> <li>In Gahombo, 85% of RDTs performed were negative</li> </ul>	<ul style="list-style-type: none"> <li>Consider an iCCM package for childhood illnesses</li> </ul>
<b>Quality of treatment</b>		
<ul style="list-style-type: none"> <li>Handling of RDT generally good as well as reading test results</li> </ul>	<ul style="list-style-type: none"> <li>Checking for danger signs is low</li> <li>Questions about patient history are not asked routinely if they are asked</li> <li>Gaps in the physical exam</li> </ul>	<ul style="list-style-type: none"> <li>In-service training session</li> <li>Observations of consultations</li> </ul>

Other weaknesses highlighted during the workshop were:

- Community involvement  
It appears that people are requesting other care, not just for malaria (a factor to consider for integrated treatment), but at the same time there is no community support in terms of gifts or support in the field, etc., possibly because the community does not sufficiently value the CHWs' work, especially in the case of Gahombo, with few positive cases.
- Country ownership and the relationship to the health system

It is true that for now, this is a pilot project, but the workshop participants recognized that the lack of budget for CHW activities from the HCs and district poses a problem. For example, sometimes CHWs do not have stock cards, and the HCs use blank sheets of paper for their reports instead of the photocopied sheets.

## **ANNEX 7: COMPOSITION OF THE EVALUATION TEAMS**

### ***1. Members of the Evaluation Technical Committee***

1. Dr Irénée Ndabagiye: Committee President – Directorate of Projects and Programs – MSPLS
2. Dr Lydwine Baradahana: PNILP (National Malaria Program) Deputy Director
3. Dr Protais Ntirampeba: Director, Directorate for the Promotion of Health, Hygiene, and Sanitation
4. Dr Félicien Ndayizeye: PNILP Treatment Unit
5. Dr Maurice Nkurunziza: Manager, PNILP Treatment Unit
6. Dr Floride Nahayon: Advisor to the Directorate General of Health Services, Ministry of Health
7. Dr Pierre-Claver Bazombanza: IMCI Focal Point, Ministry of Health
8. Dr Dismas Baza: Malaria Focal Point, WHO
9. Dr Ignace Bimenyimana: Technical Coordinator, Permanent Executive Secretary/National AIDS Control Council/Malaria
10. Dr Hassan Asmini: Director, Directorate of the National Health Information System
11. Dr Léonard Sophie: Chief, Health and Nutrition, UNICEF
12. Dr Annie Mutoni: In Charge of Maternal and Child Health, Population Services International
13. Dr Déo Mboninyibuka: In Charge of Child Health, Pathfinder
14. Aline Mukerabirori Country Project Director
15. Jeanne-Paula Nizina: PNILP Treatment Unit
16. Emmanuel Nsengiyumva: Technical Director
17. Hypax Mbanya: Manager, PNILP Treatment Unit
18. Delphin Sula: Health Manager, Concern Worldwide
19. François Niyitegeka: Program Operations Director, World Relief, Burundi

### ***2. MSH staff***

1. Jane Briggs
2. Ciro Franco
3. Dr Pascaline Harerimana

### ***3. Consultants***

1. Faustin Habimana
2. Pascal Butoyi
3. Firmin Ndayitwayeko

#### 4. Team Leaders, Investigators, and Data Entry Clerks

##### *Team leaders*

1	Emile Barazi	5	David Hamineza
2	Jean Claude Hashazinka	6	Emmanuel Karorero
3	Pacifique Mpimbaze	7	Jean Claude Nduwimana
4	Rémy Niyonsaba	8	Eric Semurunga

##### *Investigators*

1	Thomas Mbonwanayo	21	Cyriaque Bahuwufise
2	Jean de Dieu Ndabihawenimana	22	Aline Gatore
3	Aloys Ndayizeye	23	Francine Mwiseneza
4	Jean Bosco Ndayizeye	24	Richard Ndayishimiye
5	Espérance Ndonkeye	25	Charles Nininahazwe
6	Prosper Munezero	26	Clément Ngendakumana
7	Médiatrice Nduwimana	27	Emmanuel Niyokindi
8	Rénovat Nijimbere	28	Donatien Niyomwungere
9	Anitha Nindabira	29	Tharcisse Niyongabo
10	Aline Niyubahwe	30	Damien Niyonkuru
11	Evode Nimubona	31	Viateur Banyankimbona
12	Jeanine Nkuzimana	32	Peggy Bicereza
13	Fidélité Ntungwanayo	33	Yves Bikorimana
14	Vital Nzojyobiri	34	Melchiade Bukuru
15	Edouard Simbahwanya	35	Prosper Nkurunziza
16	Sébastien Butoyi	36	Félicien Irimbere
17	Emmanuel Gahungu	37	Aline Kaneza
18	Gérard Habonimana	38	Concilie Kaneza
19	Joëlle Inamuco	39	Thierry Kezimana
20	Bella Irakoze	40	Jean Berchmans Masabo

##### *Data Entry Clerks*

1	Josiane Ndayikeza	5	Olivier Ndayiragije
2	Onesphore Nimpagaritse	6	Belinda Munyana
3	Alain Bigirmana	7	Aime Lyse Maniraho
4	Janvier Nsengiyumva	8	Fulgence Mberamiheto

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## ANNEX 9: FLOWCHART USED BY CHWS

