



MSF-OCB MEDICAL DEPARTMENT

REDUCING MALARIA IN MALI

EFFECTIVE DIAGNOSTICS AND TREATMENT ARE NOT ENOUGH

MSF PROJECT IN KANGABA DISTRICT
MARCH 2011



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ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
AP	Agent Palu (village malaria worker)
ASACO	association de santé communautaire
AS + AQ	Artesunate +Amodiaquine combination therapy
CSCOM	centre de santé communautaire
CSREF	centre de sante de référence
EPI	Expanded Programme of Immunization
IEC	Information, Education, Communication
KAP	Knowledge, Attitudes and Practice
PW	Pregnant Women
RDT	Rapid Diagnostic Test



PORTUGAL

MEDECIN SANS FRONTIERES

EXECUTIVE SUMMARY

Given the high burden of illness caused by malaria in Mali, in 2005 MSF offered to collaborate with Malian health authorities to introduce an improved management approach of using Rapid Diagnostic Tests (RDTs) and Artemisinin-Based Combination Therapy (ACT). The goal was to improve access to effective diagnosis and treatment for children five years and under and pregnant women, the two groups that suffered the greatest burden of illness.

MSF chose Kangaba District in southern Mali to demonstrate the feasibility of the new management protocol. Seven community health centres (CSCOMs) and one referral hospital (CSREF) were supported through training of staff, providing supplies of RDTs and ACT and carrying out awareness campaigns in the population. Care for malaria diagnosis and treatment was provided for free.

During the first two years of the project (2005-2006) the rates of attendance at the health centres rose as compared to earlier years, but not as high as expected. Consequently, MSF reevaluated its strategy and concluded that there were significant financial and geographical barriers to access to effective care. Despite free RDTs and ACT, other costs of consultation were believed to discourage attendance and for many people living in remote villages, access to health centres was very difficult during the rainy (high malaria transmission) season.

Therefore, in the second phase of the project, from 2007 – 2010, all care for children five years and under and for pregnant women was provided for free, and a subsidised rate was applied to patients over five years. In addition, a new cadre of health workers was introduced, known as Agents Palu (Village Malaria Workers). They were chosen by their villages and after receiving training in malaria diagnosis and treatment, they provided free care for uncomplicated malaria in the more remote villages.

During the second phase of the project a number of other initiatives were employed to reduce the morbidity and mortality of malaria. They included management support of the village health management associations (ASACOs), training and support for the referral centres, targeted financial support for laboratory investigations and ambulance services, sensitisation campaigns in the villages regarding free care and the new treatment protocol, and support for a widespread campaign to introduce insecticide-treated bednets into the villages. A second referral centre and four more health centres were added to the project. In effect, there were multiple interventions over the time of the project.

The results in terms of clinic attendance and reduced mortality from malaria show a marked improvement after 2007 that continued until the end of the project in 2010. It is clear that the original goal of providing free RDTs and ACT was not enough to substantially improve malaria care in the district. Malaria management needed to be integrated into free primary health care for the target groups and care had to be extended to remote areas with Agents Palu. Finally, the feasibility of introducing the new diagnostic/treatment protocol was demonstrated to the Malian Ministry of Health.

Although it was not possible from this evaluation to prove that the outcomes were due to specific interventions, we believe that removing the financial barriers (free and subsidised care) and reducing the geographical barriers (use of Agents Palu) were likely responsible for most of the improvement in outcomes.

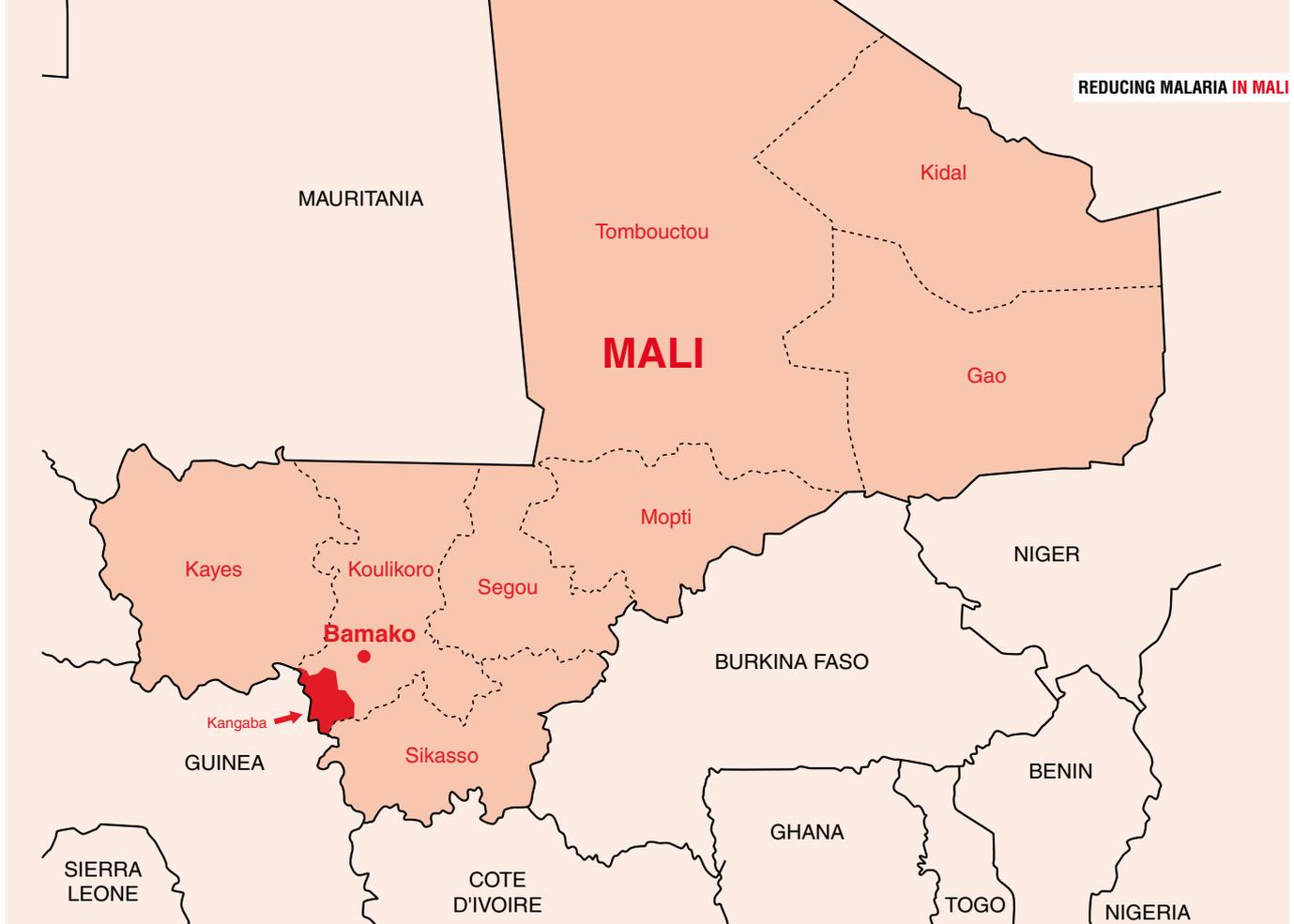
It is hoped that the Malian health authorities will be able to use the results of this project to improve malaria care in other parts of the country.



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1. INTRODUCTION

1.1 BACKGROUND

MSF has been working with Malian health staff since 2005 on a project to improve access to effective malaria care and prevention. As the project was coming to a close in March 2011, an evaluation was carried out by MSF staff to assess the impact of the project. This report describes the results of that evaluation.

1.2 OBJECTIVES OF THE REPORT

Describe, and analyse the MSF-OCB malaria project in Kangaba district, Mali, from 2005-2010 in order to assess its impact on access to care and malaria morbidity and mortality.

1.3 CONTEXT

Mali is a landlocked West African country with a surface area of 1.24 million km² that shares the borders with Algeria, Senegal, Guinea, Ivory Coast, Niger and Burkina Faso. The population was estimated to be 12 millions in 2006⁽¹⁾.

Desert covers about 2/3 of the surface area of Mali in the north and the Niger River flows from west to east in the south with seasonal flooding during the rainy season. There are three main seasons in Mali: very hot months from March to June, a hot, rainy season from July to October, and a cooler, dry period between November and March.

In Mali, 72% of the population lives below the internationally-recognized extreme poverty line and 63% lives below the national poverty line⁽²⁾. According to the UNDP human development index, Mali ranks 160th among the 169 countries surveyed⁽³⁾.

1.4 HEALTH STATUS AND MALARIA

Mali has among the highest maternal and child mortalities in the world: 528 women die per 100,000 live births and almost 20% of children die before reaching the age of five⁽⁴⁾.

Malaria is a major public health problem in Mali as it constitutes the main cause of morbidity and mortality. On average, children under five experience two episodes of malaria per year, while those over five year

suffer from one episode of malaria per year⁽⁵⁾. The proportion of child deaths in Mali due to malaria is 17%⁽⁶⁾. Figures from 2009 in the World Malaria Report indicate that Mali has had a steadily increasing number of reported cases and deaths (1,600 and 2,300 respectively in 2009) over the past decade⁽⁷⁾. However, the actual numbers of malaria cases and deaths are considered to be higher since most of the cases are unreported⁽⁶⁾.

Malaria is endemic in the central and the southern regions while potentially epidemic in the northern areas. Peak malaria transmission occurs from July to December. Due to flooding, access to villages that are located more than five km from community health centres becomes extremely difficult during this season.

The national malaria control policy aims for the prevention and the management of all malaria cases. However, in practice, the combination of environmental, geographical and economic conditions renders health care services in Mali inaccessible to most of the population.

1.5 MALI HEALTH SYSTEM

The health system in Mali is based on the principles of the Bamako Initiative, where primary health care is delivered using a cost recovery system that is managed by the community⁽⁸⁾. The health system pyramid's first two levels are made up of community health centres (CSCOMs) and referral health centres (CSREFs). The CSCOMs provide basic primary health services and are managed by community health associations (ASACOs) whose members are recruited from the villages being served.

The CSREFs are the primary referral centres for CSCOMs. They are responsible for medical, surgical and obstetrical emergencies and also offer paediatric and nutrition services.

According to the principle of cost recovery, communities are meant to support their health services through user fees. These fees are collected for consultations, tests, medications, treatments, and hospitalisation. The fees are managed by community-elected management committees (ASACOs) that in turn pay salaries of staff at the CSCOMs, buy drugs and provide maintenance to clinic buildings.

1.6 JUSTIFICATION OF MSF PROJECT

In 2003/4 Epicentre (MSF), the Malian Department of Epidemiology for Parasitic Infections and the Malaria Research and Training Centre performed a study that confirmed a high rate of resistance to chloroquine (90.4%) in Koumantou district in Mali⁽⁹⁾.

In addition, MSF carried out a health care survey on access to care in Bougouni district in Sikasso region of Mali (South-East from Kangaba district)⁽¹⁰⁾. It found that the primary cause of illness was "fever", especially in children under five years and that "fever" accounted for over 40% of deaths. Twenty percent of the population was excluded from care, with lack of funds as the primary reason, in a context where 51% lived below \$1.25 PPP (percentage of population living below a nationally-



"Cercle" (District) of Kangaba, located South West of Bamako bordering Guinea

defined poverty line)⁽¹¹⁾ per day. Families reported that the cost of an episode of illness in a health centre represented two months' income.

By 2005 the government of Mali had approved the use of Rapid Diagnostic Tests (RDTs) and Artemisinin-based Combination Therapy (ACTs). Since the MSF Operational Centre Brussels (MSF-OCB) was already operating in the country, and involved with malaria, it offered to demonstrate how to operationalise the combined use of RDTs (Paracheck) and ACT (Artemisinin + Amodiaquine = AS+AQ treatment).

MSF-OCB chose Kangaba district because it was relatively small, it was in a zone of high endemicity and it was close to Bamako, thus simplifying logistics.

1.7 LOCAL CONTEXT

Kangaba is located 90 km south from Bamako with an estimated population of 100,200⁽⁵⁾. At the beginning of the project it had seven functional community health centres (CSCOMs) each managed by a community health association (ASACO) and one CSREF covering a population of about 73,000. The CSCOMs were Kangaba Central, Salamale, Keniegoue, Kenieba, Karan, Narena and Tombola while the CSREF was simply called Kangaba.

In order to overcome the geographical barrier of the Niger River and to address high levels of morbidity and mortality due to malaria revealed by a 2008 survey⁽¹²⁾, three new CSCOMs (Manicoura, Selenfougou, and Figura Toma) and one CSREF, (Selingue) were added to the Kangaba district project in 2008. See map above.



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2. MSF PROJECT OVER TIME

In this project, objectives and strategies changed over the course of time. The graphic below outlines the timelines and is followed by more detailed descriptions. This was a complex project with multiple simultaneous interventions which inevitably influenced each other. Thus, this report must be seen as a descriptive summary of events and outcomes over time. It cannot attribute definite cause and effect.

YEAR	PHASE I Aug 2005 - Nov 2006		PHASE II Dec 2006 - Dec 2008			PHASE II Jan 2009 - Dec 2010	
	2005	2006	2007	2008	2009	2010	2011
1. OBJECTIVES	A		B	C		D	
2. CSCOMS	A			B	C		
3. CSREFS			A		B		
4. ASACO SUPPORT			A		B		
5. FINANCIAL SUPPORT	A		B		C		
6. DIAGNOSTICS	A						B C
7. TREATMENT	A		B		C	D	E
8. AGENTS PALU				A	B	C	D
9. REFERRALS	A		B		C		
10. HEALTH PROMOTION/BEDNETS	A						B

OBJECTIVES

- A AUG 2005** Free access to effective malaria diagnostics and treatment for children ≤5y
- B DEC 2006** Free access to primary health care for ≤5y and pregnant women with fever
- C JULY 2007** Addition of geographic access (APs) for ≤5y and 6-10 yrs for diagnosis and treatment of uncomplicated malaria and referrals for severe cases and patients with negative RDTs
Pregnant women were now routinely tested and treated at CSCOMs at each antenatal clinic visit
- D JULY 2009** Added age group of 10-13 yrs as in (c)

CSCOMS

- A AUG 2005** Started with seven on “rive gauche” (Kangaba Central, Salamale, Keniegou, Tombola, Kenieba, Narena, Karan – covering population of 73,000)
- B JAN 2008** Added Balan Bakama, “rive gauche”
- C JULY 2008** Added three on “rive droit” (Selefougou, Figuira Tomo, and Manicoura)

CSREFS

- A DEC 2006** CSREF Kangaba
- B NOV 2008** Added CSREF Selingue

ASACO SUPPORT AND MANAGEMENT TRAINING

- A DEC 2006** Started in the original seven CSCOMs
- B JULY 2008** Added four new CSCOMs

FINANCIAL SUPPORT

- A AUG 2005** RDT and ACT for free with other fees by the cost recovery system for ≤5y. >5y paid flat fee of 85 CFA for RDT and ACT with all other fees by cost recovery system

- B DEC 2006** MSF replaced all fees from the cost recovery system by a fixed payment of 1000 CFA for all consults for patients ≤5y and febrile pregnant women. Febrile >5y patients paid a flat fee of 200 CFA covering consultation and treatment.
- D FEB 2008** MSF removed 1000 CFA payment for ≤5y and changed to two-tier financial support system: fixed (staff salaries) and variable payments (motivational bonuses to staff). The 200 CFA flat fee for >5y remained.

DIAGNOSTICS

- A AUG 2005** Paracheck used throughout till Jan 2010 in CSCOMs.
- B JAN 2010** RDTs for all ≤5s (even if positive diagnosis of other febrile illness, eg otitis media)
- C JUNE 2010** SD Bioline RDT introduced at CSCOM level.

TREATMENT

- A AUG 2005** ACT and quinine as required
- B DEC 2006** Treatment for all febrile illnesses including malaria (antibiotics or ACT)
- C JULY 2008** Introduction of pre-referral artemether (referrals CSCOM to CSREF)
- D JULY 2009** Started treatment of three doses artemether at CSCOMs
- E JULY 2010** Introduction of Rectocaps by APs

AGENTS PALU

- A JULY 2007** Started in original seven CSCOMs only during high season, July – Dec (18 APs)
- B JULY 2008** Added the other four CSCOMs (42 APs)
- C JULY 2009** Added more APs (66)
- D JULY 2010** Two APs were recruited by ASACOs (68)

REFERRALS BY AMBULANCE

- A AUG 2005** Patients paid full cost except pregnant women (Malian system).
- B DEC 2006** MSF started to pay a fixed rate according to a calculation based on distance and number of cases to the ASACO plus the patients' contribution (10,000 CFA) for ambulance service for original seven CSCOMs. Thus, patients did not have to pay anything for ambulance service.
- C JULY 2008** Same system added to the other four CSCOMs

HEALTH PROMOTION/BEDNETS

- A AUG 2005** MSF health promoters supported 15 members of the Relais per CSCOM for Information, Education and Communication (IEC) activities and bednet instruction and distribution. The number of health promoters increased from one person to eight by Jan 2009. MSF supplied bednets to target groups of all children who had completed routine EPI vaccination and for all pregnant women at their first antenatal visit.
- B JAN 2009** Provided supplies of bednets in cases of stock ruptures. uncomplicated malaria and referrals for severe cases and patients with negative RDTs Pregnant women were now routinely tested and treated at CSCOMs at each antenatal clinic visit
- C JULY 2009** Added age group of 10-13 yrs as in (c)



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3. THREE PHASES OF THE MSF PROJECT

3.1 PHASE 1 AUGUST 2005 – DECEMBER 2006

The project began in August 2005 with the specific objectives of providing free RDTs and ACT treatment to children five years of age and under at seven CSCOMs and at the outpatient department of the CSREF in Kangaba district (population 73,000). Local staff were trained in the new diagnostic and treatment protocols. Training also included community workers (the Relais) who taught villagers about the effectiveness of the new treatment programme and the use of insecticide-impregnated bednets for infants and pregnant women. Intermittent preventive treatments were also given to pregnant women during their second and third trimesters.

At the end of the first phase, RDTs and ACTs had been successfully introduced; however, there remained financial and geographical barriers to care in general. Even though RDTs and ACTs were provided free, the other costs associated with consultation and treatment for non-malaria

diagnoses were not covered, and during the rainy season, many villagers could not reach the CSCOMs. These barriers were reflected in the relatively small change in attendance rates at the CSCOMs of 0.27 new curative consultations for all diseases/inhabitant/year in 2006 as compared to 0.22 in 2005, both of which were below the WHO expected rate of 0.5-1.0⁽¹³⁾. Despite the emphasis on malaria in children $\leq 5y$, the attendance for malaria remained low at 0.25 episodes of malaria/child/year in 2005 and 0.38 for 2006 as compared to the MSF 2005 health survey in Bougouni that estimated a rate of 2.0 episodes⁽¹⁰⁾. Given these limited results, MSF reoriented its programme and began Phase 2 at the end of 2006.

3.2 PHASE 2 DECEMBER 2006 – DECEMBER 2008

There were two major changes in Phase 2 that addressed financial and geographic access to care. Children under five and pregnant women were provided with completely free care for all causes of fever,

and village malaria workers, (Agents Palu – APs), were introduced to provide increased access to care during the rainy season in more remote villages. MSF compensated the ASACOs for the lost fee revenue and also provided some incentive funds for the CSCOMs' staff. For patients $>5y$, there was a reduced fixed fee of 200 CFA to cover all costs for care of "fever".

At the CSREF, training, supervision and medicines were provided to treat, for free, all complicated malaria cases referred by the CSCOMs. MSF also provided funding for ambulance services, transfusion safety training, laboratory equipment and essential reagents.

In addition, a community-based mortality study carried out by MSF-OCB⁽¹²⁾ in 2008 on both sides of the river in the area covered by Kangaba, showed that mortality was twice as high on the Selingue side. Therefore, from July 2008, three additional CSCOMs were added to the original seven. They were unusual since they used the CSREF in Selingue as a referral centre because it was closer than Kangaba which



required a river crossing to access. MSF added support to Selingue CSREF comparable to that provided to Kangaba CSREF.

By the end of Phase 2 there had been significant improvements in performance. The number of consultations trebled, the attendance rate for $\leq 5y$ quadrupled, attendance by pregnant women increased by 3.5 times, the total number of malaria cases treated tripled and severe malaria and deaths in CSCOMs decreased dramatically. (See Table and Figure 1.)

3.3 PHASE 3 JANUARY 2009 – DECEMBER 2010

The final phase of the project was a continuation and consolidation of existing activities in anticipation of handing over to a local partner. There were several changes in the treatment algorithm and diagnostic testing during this time. In July 2009, treatment of severe malaria at the CSCOMs with artemether was introduced, reducing the numbers referred from the CSCOMs to the CSREFs. Meanwhile, the APs began using Rectocaps for patients they referred to the CSCOMs in July 2010. The SD Bio-line RDT test replaced Paracheck in June 2010 in CSCOMs (but not for the APs). Plans were made for the withdrawal of MSF from the project in March 2011. Documentation and analysis of the whole project, adding in data for the final three years, were also important components.





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4. ASACOS AND MSF SUPPORT (FINANCE AND MANAGEMENT)

The ASACO is the community representative body of the CSCOM. It is comprised of two elected villagers from each of the CSCOM target villages. From the ASACO, a small group is elected to form the Management Committee, in charge of the execution of all activities in the CSCOM.

A standard Management Committee consists of at least five people:

- 1) President
- 2) Accountant
- 3) Treasurer
- 4) The CSCOM medical representative: "Chef de Poste"
- 5) Administrative Secretary



The functioning of the ASACOs in Kangaba district could be described in five phases:

- 1) Prior to MSF's collaboration
- 2) Three financial stages of collaboration with MSF
- 3) Following MSF's departure

A detailed description of each phase is described below.

4.1 FINANCIAL SYSTEM PRIOR TO MSF COLLABORATION

In keeping with the Bamako Initiative⁽⁶⁾, a CSCOM in Mali functions through a cost recovery system that was managed by the ASACO. Revenues were obtained through fees for consultations, medical care (dressings, injections, obstetrical deliveries, and hospitalisation) and the selling of pharmaceutical products (drugs and consumables). Drugs were bought from the district depot and were sold with a 1.2 – 2.5% profit.

The monthly income was put into a bank account where withdrawals were made to

maintain the clinic buildings and equipment, buy new stocks of drugs, and pay staff salaries, (with annual bonuses if there was an excess of funds over needs). However, prior to MSF's arrival, the system was not functioning well in Kangaba district since there were few consultations and treatments so that the income generated was inadequate.

"Before (MSF arrived) we maybe had only four consultations/day as people are too poor and can not pay for the ticket and the drugs". "People would rather go straight to the market and buy the drugs there."
(President)

"We even had not enough revenue to pay our staff their salaries as we did not sell enough tickets and drugs."
(President)

"The drug depot at CSREF did not always have all drugs, so we needed to go to Bamako and buy them there."
(Accountant)



4.2 FINANCIAL STAGE 1 OF COLLABORATION WITH MSF (AUG 2005 – DEC 2006)

In the first phase, the cost recovery system of funding was kept untouched except that MSF supplied Rapid Diagnostic Tests (RDTs), Artemisinin-based Combination Therapy (ACTs) and Paracetamol for free. This strategy was supposed to cover free diagnostics and treatment for children ≤ 5 years for malaria, while all patients > 5 years still needed to pay a flat fee of CFA 85, (equal to previous chloroquine treatment). Despite this support, an assessment of the programme in 2006 showed only a small rise in rate of consultations and, thus, a small improvement in income. It was not enough to substantially change the funding issues for the ASACOs and did not seem to have addressed the financial barriers to adequate care (in addition to showing a disappointing increase in clinic attendance).

4.3 FINANCIAL STAGE 2 OF COLLABORATION WITH MSF (DEC 2006 – FEB 2008)

In the second stage, MSF abolished the cost recovery system in order to break down the financial barrier to access to primary health care. This resulted in major changes for the ASACOs in managing the cost recovery system. During this stage,

MSF drew up “Compensation and Incentives Contracts” with all seven ASACOs that included:

- paying the salaries of certain staff (those not paid by the MoH)
- paying a fee of 1000 CFA/consultation performed at the CSCOM for children ≤ 5 years and febrile pregnant women
- supplying RDTs, ACT and other essential drugs (eg antibiotics)
- paying the ASACOs’ contribution for ambulance referral services
- training and supervision of the ASACO’s activities, in particular, the management of revenues to assure proper functioning of the CSCOM.

In return, the ASACOs committed themselves to ensure:

- free access to all children ≤ 5 y
- free access for all febrile women for malaria treatment and prevention
- all patients > 5 were not charged more than a CFA 200 flat fee
- a functioning referral system, including providing transport
- that IEC activities were carried out in their catchment area through the employment of 15 MSF-supported community workers
- maintenance of clinic buildings as well as provision of supplies.

During this time consultation rates quadrupled in the seven CSCOMs. With the new funding in place (eg CFA 1,000/consultation), the revenue of the ASACOs increased dramatically and ushered in a new era.

“Yes we started to have a huge bank account which gave us the opportunity to pay the delayed salaries of our staff”.
(Accountant)

“We even recruited one more staff member”
(President)

4.4 FINANCIAL STAGE 3 OF COLLABORATION WITH MSF (FEB 2008 – DEC 2010)

In 2008, a costing study of the ASACO’s expenses was performed by MSF⁽¹⁴⁾. It showed a large imbalance between income and expenses: income was much higher than expenses, resulting in large surpluses for the ASACOs (a very unusual circumstance in Mali!). There was also a question of whether the fixed fee encouraged good quality care. Consequently, a new contract was drawn up with the ASACOs with the main difference being that the CFA 1,000/consultation was replaced by a two-tier system: fixed and variable compensation. The fixed compensation covered staff salaries (those on the ASACOs’ payroll), maintenance expenses based on the monthly mean of previous year, and the costs of ambulance referral carried by ASACOs.

The variable compensation was motivational and based on an evaluation performed by a committee consisting of a MSF evaluator, an ASACO member and the Chef de Poste. The set of indicators included:

- a) performance of all health activities performed by the health staff. (quality of medical care, transparent pharmacy management, monthly data reporting)
- b) level of the ASACO’s functioning: planning and management of the CSCOM, (transparent accounting, following of Annual Action Plans, recording of monthly meetings, General Assemblies)

This system created much greater interaction between MSF, the ASACOs and CS-

COMs' health staff in order to promote a higher standard of care and management.

A direct financial consequence of this system was a large drop in revenue for the ASACOs, (even by half in some cases). However, this drop appeared to have no influence on the patient care, as the attendance at the CSCOMs remained high and continued to increase. See Figure 1 below.

"Yes, of course, we saw the huge difference in revenue, but this only concerned the ASACO, the patients wouldn't have noticed".

(Treasurer)

"The evaluation part is good, as it gives us motivation to improve and to learn more".

(Chef de Poste)



4.5 FINANCIAL SYSTEM AFTER MSFS DEPARTURE

The above described system continued to function up to the end of 2010. However, as MSF had planned to leave by the 31st of March, 2011, and had held several informative and participative meetings, it was important to know how the ASACOs saw the future. Meetings with two ASACOs pursued this issue.

By early 2011 amongst the original seven CSCOMs, the following circumstances existed: (a) a well-functioning financial system had been put in place, (b) ASACOs and health personnel had received management and clinical training, (c) two village malaria workers (APs) had been put on the payroll in two ASACOs, (d) two ASACOs had written their Annual Action Plans for 2011.

Based on two interviews with ASACO members, it seems that perception of fu-

ture directions was quite different from one to another. One ASACO could only express hope that a follow-up partner would be identified by MSF. In the meantime, they had not worked out an alternative financial plan. The second ASACO had discussed the withdrawal of MSF amongst themselves and had even considered, independently of MSF, what partners could possibly take over.

Both ASACOs, without any reservation, felt that without a new financial partner, funding would revert to the original cost recovery system to pay for salaries (thereby excluding the APs, except for the two ASACOs that had recruited one each), including paying social security (a newly recognised cost imposed on the ASACOs), drugs, clinic operations and fuel for motor bikes (that had increased significantly).

Given the likelihood of reverting to the old cost recovery system, the two ASACOs were beginning sensitisation for their target populations to inform them about the changes. Meanwhile, at district level, they were beginning to come to a consensus on standardized prices for consultation and medical acts.

Providing free care to indigents was also a significant issue. Under the legislation of the Bamako Initiative⁽⁶⁾, this was meant to be a responsibility of the ASACOs, who liaised with the social development sector for reimbursements. However, there were no specific criteria for who qualified as an indigent and the ASACOs did not have plans in place to deal with them before MSF arrived. It was also very difficult to assign the status of "indigent" in a population where the majority of people lived below the poverty line. With MSF's financial support, care for indigents was not an issue, as they were more or less covered, but in the future the ASACOs suggested that they would have much more difficulty supporting indigents with limited funding.

"We have a bad experience with the city council that is supposed to reimburse the costs we've had by giving free care to an indigent. Up to now they have not reimbursed us."

(President)

When the ASACOs were asked about their thoughts about "free access to care" they recognised that the frequency of consultations had increased during the MSF presence, resulting in much greater revenue, and that there had been a major change in health-seeking behavior and a clear drop in mortality amongst children. Without "free access to care", the ASACOs suggested that these positive results would diminish due to the return of financial barriers.

"When people know that when they come that good treatment can be given, they will come".

(President Representative)

"We will see fewer people coming but if we can have around 300 consultations/month we can manage".

(Accountant)



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5. AGENTS PALU

In July 2007, besides lifting the financial barriers, MSF wanted to improve geographical access to malaria diagnostics and treatment, particularly during the rainy season, July –Dec, when many villages were isolated due to blocked roads. This left people without access to health care at the time of high malaria transmission. In response, MSF created an outreach system during the high transmission season for diagnosis and treatment of malaria for children between three months – 13 years of age, through the introduction of village malaria workers, “Agents Palu” (APs).

5.1 SELECTION AND TRAINING

The selection of sites for AP intervention were identified through two criteria:

- >5 kilometers distance from a CSCOM
- inaccessibility by road during the rainy season.

After site selection, APs were recruited, both men and women, during village assemblies using the following criteria:

- being respected in the community
- being available for 100% of the time (ie no other jobs)
- being able to read and write in French

- being able to ride a bicycle
- being able to make simple calculations.

MSF provided three days of theoretical training in Kangaba followed by practical training in each of the AP's locality for another three days with their supervisors and the Chef de Poste of the CSCOM. This allowed each AP to get practical experience and become familiar with the CSCOM staff and their target population.

The job profile for APs included:

- knowing the different clinical signs of uncomplicated and severe malaria
- taking temperature, recognising a fever

when the temperature was $>37.8^{\circ}\text{C}$, and taking history of fever in the previous 48 hours

- performing an RDT
- if RDT positive \rightarrow treating with ACT and Paracetamol according to MSF protocol, supervising the first dose, and instructing patients on how to take the rest of the treatment
- if RDT negative \rightarrow refer to CSCOM, giving a referral paper
- in cases of severe malaria, referring to the CSCOM (with a referral paper), and as of July 2010, using Rectocaps for pre-referral treatment.



- recording their activities using a pre-designed tally sheet for data collection (RDTs done, RDTs positive and negative, severe malaria, referrals, drug consumption)

5.2 SUPPLIES

MSF provided a medical and non-medical kit and a bicycle for every AP consisting of:

- RDTs (Paracheck)
- ACT (AS + AQ) with different doses for infants three to eleven months, children 1-5 years, 6-10 years (which became 6-13 years in 2010) and Paracetamol 500mg
- Rectocaps, 50 and 200 mg.
- Examination gloves
- Electric thermometer
- Sharps disposable box
- Some consumables



The non-medical kits consisted of:

- gum boots, rain coat, mosquito net,
- torch, backpack, timer
- MSF/AP vest for identification,
- small amount of stationery supplies
- box with a padlock

As employers of the APs, the ASACOs received a monthly compensation of CFA 25,000/AP from MSF with which they paid the APs. The ASACOs were made responsible for providing further consumables and maintenance costs for the bicycles.

Each year, refresher training took place for the experienced APs, and it was integrated into the training for the newly-recruited APs.

5.3 SUPERVISION

APs were supervised by a MSF supervisor, a State Registered Nurse by profession. Supervision included:

- random visits at the sites to confirm the AP's presence according to their planning
- correct utilization of diagnostic and treatment protocols
- correct use of data collection sheet
- trouble-shooting problems (older people wanting free treatment, referrals who didn't want to go to the CSCOM, etc.)

The supervision schedule was based on the amount of coaching APs appeared to require, rather than a fixed number of supervision visits. This customised approach allowed each AP to reach high standards fairly quickly. Based on this supervision plan, only two APs were withdrawn by the supervisors, one due to frequent absences and the other for failing to adhere to protocols. Once a month, all APs would come to their home CSCOM where their data were audited by the supervisor and new RDTs/drug supplies were given out based on calculations of consumption.

5.4 COVERAGE

Over four years, MSF progressively increased coverage by adding more APs. Each AP would cover several villages and hamlets within a mean radius of about 10 kilometers and the numbers ranged from two to ten villages/hamlets depending on the size and distances to cover. In 2007, in the original seven CSCOMs 18 APs started covering 90 villages and hamlets while this increased to 50 APs covering 140 in the last season of 2010. In the total of 11 CSCOMs, by 2010, 68 APs were covering 193 villages or hamlets and were being supervised by six MSF nurses. Based on MSF's evaluation, APs were providing coverage to 62% of the population living >5kms away from the CSCOMs (15). However, this figure is not entirely precise due to incompatible age-group definitions between the national census data and the MSF programme.



The Relais was a community-based network that, supervised by the ASACO, disseminated health prevention messages in their villages. See Health Promotion (Section 6) In theory, APs had a functional relationship with the community workers



from the Relais. After the APs had seen patients, the Relais were meant to follow up adherence to treatment, and encourage referrals to the CSCOM. In practice, this did not always work out, due to some bad relations between the two groups regarding a large compensation differential. (See Section 6.)

5.5 EXPERIENCES

During our visit, we interviewed three APs (two men, one woman) accompanied by their supervisors (two supervisors responsible for 17 APs) and they shared their experiences:

- Children tested/day versus RDT positive:
 - AP 1 saw 10 – 12 children / day
→ 7-8 RDT + (68%)
 - AP 2 saw 8 – 9 children / day
→ 6-7 RDT+ (76%)
 - AP 3 saw 5 children / day
→ 3 RDT+ (60%)

- Two APs felt that, over time, they saw fewer severe malaria cases, as most people would come early for diagnosis.

“Even if I’m in another village, they will come to search for me as they know now.”

However, one AP said the contrary: *“People wait until it is their scheduled day when I come. If this is still a few days to go, the child falls ill with severe malaria.”*

- Being a male or female AP did not appear to have any influence on the health seeking behaviour of the mothers bringing their children.
- The use of Rectocaps was felt by one AP to be very good, although another AP said that it took a while before it was culturally acceptable to administer. None of the APs had the impression that people misinterpreted the Rectocap as being the treatment for malaria rather than a pre-referral drug.

- Supervisory visits were felt to be sufficient and useful. The supervisors sorted out problems (eg liaising between ASACO and AP for bicycle repair) and improved/corrected small errors in utilization of the tally sheet.

Problems encountered by APs included:

- People outside the target groups demanding treatment
- Inaccessible roads even by bicycle (despite carrying them on their shoulders to cross rising water) sometimes leading to inaccessibility of the village
- Bicycle repairs were not provided promptly by ASACOs.
- Despite increased health-seeking behaviour, in certain areas, (eg gold mining area) women were too busy to come.
- Stock ruptures, although rare.



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6. THE “RELAIS” – HEALTH PROMOTERS

The Relais was a community-based network under the supervision of the ASACOs and was responsible for health education and promotion in the villages regarding malaria, malnutrition, hygiene, and other preventive messages.

One month before the malaria programme began in Kangaba, MSF met with the original seven ASACOs and agreed to support 15 out of each Relais' 45 community workers. Their job was to sensitize all target villages on the new malaria programme. That included educating about the changes in diagnosis and treatment, (including adherence), and promoting



changes in health-seeking behaviour and prevention measures (follow-up on bednet usage).

MSF provided training on malaria prevention and the signs of uncomplicated and severe malaria. A second component of the training was the use of different types of communication (story telling/theatre, group talks, school visits, radio, and later, video) in order to effectively pass on the messages.

MSF provided each community worker who passed the training with a bicycle, that was to be maintained through the ASACO. MSF did not provide any motivation/compensation. This was left to the ASACO.

From the initial seven CSCOMs, there were in total 105 Relais community workers who were being supervised by initially two and, later on, four MSF health promoters.

Over the project phases, the activities of the Relais with their supervisors increased and included:

- liaising with local authorities
- disseminating IEC activities concerning malaria prevention and care
- participating in bednet distribution and education on proper usage
- assisting their ASACOs with community meetings
- assisting APs in ACT adherence and follow-up when patients were referred to a CSCOM.

Unfortunately, the last point did not work out as planned, due to the differential in financial support between the Relais and APs that MSF created. For instance, an unpaid voluntary community worker could become an AP and receive CFA 25,000 per month while the Relais volunteer only received a bicycle. Although the APs needed to be able to dedicate 100% of their time to their work, which was not the case for the Relais worker, this was not perceived to be fair and de-motivated the Relais workers enormously.



A Relais community worker would only receive a small compensation from the ASACO before important religious celebrations, something that was completely dependent on the ASACOs' goodwill.

A KAP survey on bednet utilization⁽¹⁶⁾, performed in 2010 revealed that bednets were widely distributed in Kangaba district - 98% of all interviewed households had bednets, with an average possession of 2.96 bednets each, while 71% of people in these households reported sleeping under their bednets. Bednets had been distributed in various ways – to mothers completing the primary series of vaccina-

tions for infants, to pregnant women attending ante-natal clinics and through mass campaigns. The Relais supported these activities through health education. However it is impossible to determine how much the Relais' activities have contributed to the high overall uptake of bednet usage.

Similarly, we could not attribute how much the changes in health-seeking behavior were related to Relais' activities. However, the changes were dramatic, as documented by rise in attendance and according to the APs and ASACOs, so that it seems likely that they contributed to the changes.





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7. ANALYSIS – METHOD

This is a descriptive analysis and cannot attribute causation for the results of the interventions.

The data upon which this report is based were collected in the following manner: health care workers in the CSCOMs recorded cases in a standard Ministry of Health (MoH) register. The CSCOM Chefs de Poste collected the cases from the registers and copied them onto MSF data collection forms monthly. The AP supervisors collected the data from the AP tally sheets. The supervising physicians for the CSCOMs and APs created Excel spreadsheets based on the raw data and gave them to the data manager who consolidated them into an overall spreadsheet. This data entry was not double-entered or checked.

The total population of the original seven CSCOM districts was estimated at 73,000 in a mortality study by MSF in 2008⁽¹²⁾.

Definitions of severe malaria included cases of fever ($>37.5^{\circ}\text{C}$ axillary) with neurological signs (convulsions, altered level of consciousness), anaemia (clinical diagnosis), or repeated vomiting/diarrhea. Deaths were taken from CSCOM and CSREF registers, so the figures only included deaths in those facilities. The causes of death were those recorded in the registers. If there was more than one diagnosis of death and malaria was among them, then the death was attributed to malaria.

The study team also held interviews with four CSCOMs, three ASACOs, three APs (with their supervisors) and the District Medical Officers in the two CSREFs. The interviews were held at the health centres and allowed for detailed explanations of roles, functions and experiences of each group. This was in addition to regular contact with the MSF coordination and Kangaba implementation teams. Given the limited numbers of people interviewed, the descriptions can only be considered as anecdotal.

7.1 ETHICS

This report was based on using routinely-collected programme data that satisfied the MSF Ethic Review Board criteria for this kind of study and formal ethics approval was not required. Local MoH staff in the CSCOMs and CSREFs were involved in data collection and were part of the project.



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8. RESULTS/DISCUSSION

Table 1 and **Figure 1** show the overall impact of the MSF programme in Kangaba district in the original seven CSCOM areas over six years of the project. The total number of cases jumped dramatically in 2007 and continued to rise following the introduction of improved financial and geographical access, i.e. targeted supportive

funding and APs. From 2007, after an initial large increase, the numbers treated by CSCOMs rose slowly and steadily while the contribution of the APs increased more quickly. Pregnant women began to be recorded in 2006 and for them consultations remained fairly steady after 2007.

Table 1: Total New Cases (All Diagnoses) in Seven CSCOMs 2005 – 2010

Year		2005	2006	2007	2008	2009	2010
Total New Cases		14361	19555	61083	69891	85939	101493
	≤5	5405 (37.6%)	8652 (44.2%)	37530 (61.4%)	41356 (59.2%)	49541 (57.6%)	57412 (56.6%)
	>5	8956 (62.4%)	9852 (50.4%)	19453 (31.1%)	24155 (34.6%)	31708 (36.9%)	39259 (38.7%)
CSCOM		14361	18484 (94.5%)	49864 (81.6%)	52804 (75.6%)	58023 (67.5%)	70348 (69.3%)
	≤5	5405 (37.6%)	8632 (47.7%)	31611 (63.4%)	32014 (60.6%)	33482 (57.7%)	38895 (55.3%)
	>5	8956 (62.4%)	9852 (53.3%)	18253 (36.6%)	20790 (39.4%)	24181 (42.3%)	31453 (44.7%)
AP#		0	0	7159 (11.7%)	12707 (18.2%)	23226 (27.0%)	26323 (25.9%)
	≤5	0	0	5919 (82.7%)	9342 (73.5%)	15699 (67.6%)	18517 (70.3%)
	>5	0	0	1240 (17.3%)	3365 (26.5%)	7527 (32.4%)	7806 (29.7%)
PW*			1071 (5.5%)	4060 (6.7%)	4380 (6.3%)	4690 (5.5%)	4822 (4.8%)

AP – Agents Palu

* PW – Pregnant Women

Fig 1: Total New Cases (All Diagnoses) in Seven CSCOMs 2005 - 2010

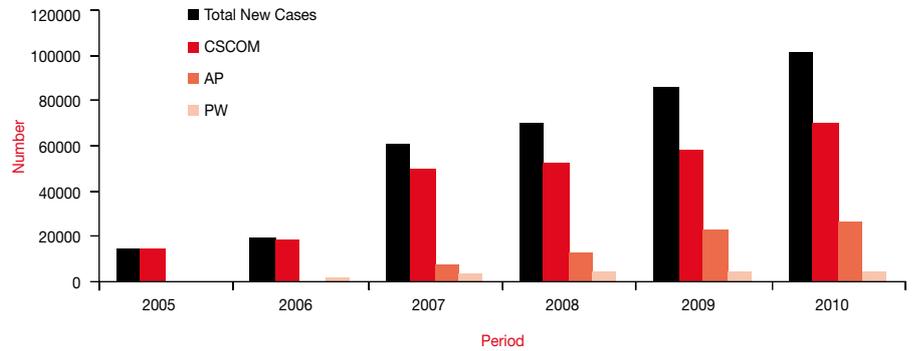
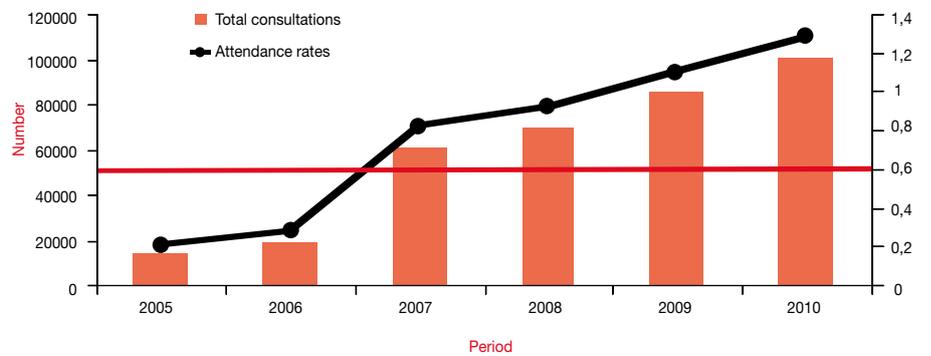


Figure 2 shows the cumulative rate of attendance at the seven health facilities/ services during the six years of the project. Following the increased access in 2007, the rate jumped to more than the 0.6 attendances/inhabitant/year as suggested as a standard by WHO for rural areas^(7, 17).

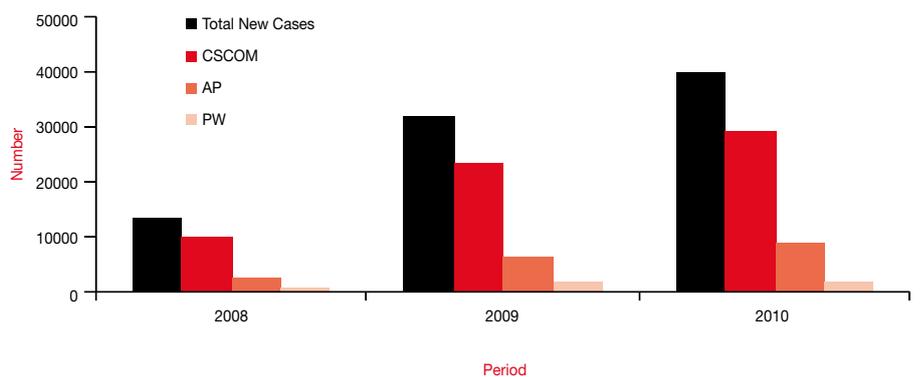
Fig 2: Attendance Rates (All Diagnoses) in Seven CSCOMs 2005 - 2010



The Red Line indicates the WHO reference for rate of consultations/inhabitant/year for rural areas⁽¹⁷⁾.

Figure 3 shows that new cases increased in the same pattern as the original seven CSCOMs in the four new CSCOMs added after 2008.

Fig 3: Total New Cases (All Diagnoses) in Four New CSCOMs 2008 - 2010



Figures 4 and 5 show the relative proportions of malaria cases vs other diagnoses for both $\leq 5y$ and $>5y$ patients. For the $\leq 5y$ group, that benefited immediately in 2007 from the provision of free malaria and primary care, the new cases jumped quickly in 2007 and were evenly distributed between malaria and other diagnoses until 2010. In 2010, more malaria cases were likely discovered due to the new diagnostic algorithm that screened all children with fever for malaria, even those with an obvious other cause for the fever.

For those $>5y$, the rise in new cases began in 2007 and continued to rise over the following four years. This would likely reflect the ongoing supported fee structure for this group, which was made more accommodating to children under 14 years after 2008.

Figures 6 and 7 show the sharp rise in malaria cases treated during the six month high transmission season (July – December) with the relative contributions of CSCOMs and APs. In both cases the contributions by APs to the total malaria diagnoses was impressive, surpassing the percentage of malaria cases managed by the CSCOMs. Indeed, referring back to Figure 1, it was clear that most of the rise in total consultations came from the contributions of the APs. Their deployment appeared to have been a very strong component of effective malaria care.

Fig 4: New Malaria Cases and Other Diagnoses in children $\leq 5y$ 2005 - 2010

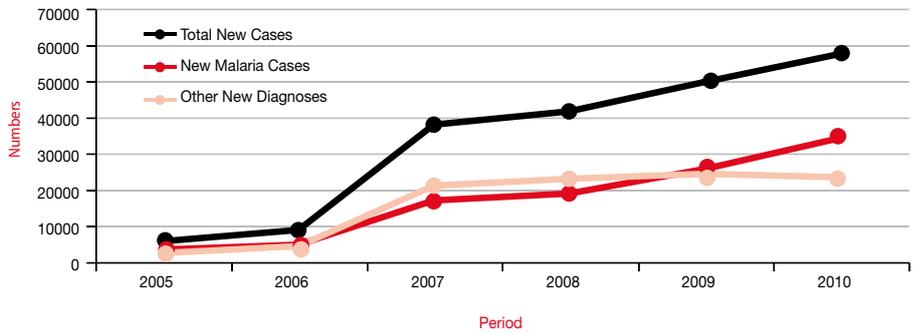


Fig 5: New Malaria Cases and Other Diagnoses in Patients $> 5y$ 2005 - 2010

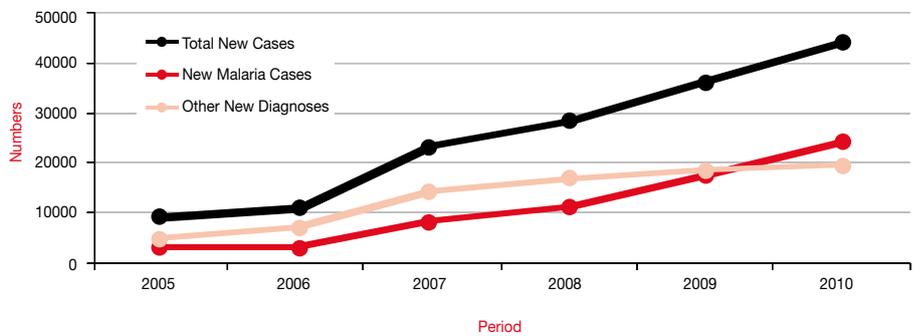


Fig 6: New Malaria Cases in High Transmission Season in Children $\leq 5y$ 2005 - 2010

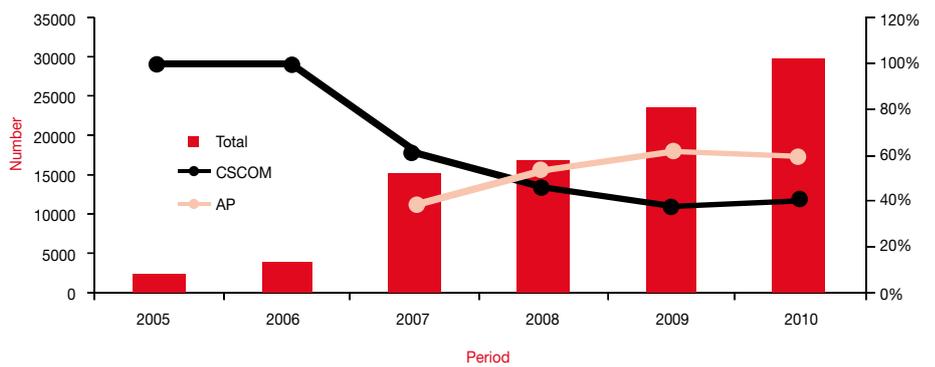
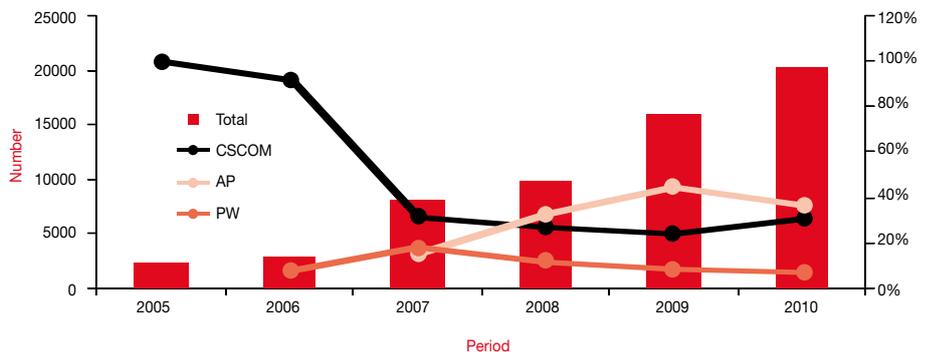


Fig 7: Total New Malaria Cases in High Transmission Season in Patients $> 5y$ 2005 - 2010



Prior to 2007, pregnant women were only treated for malaria if they presented with symptoms. Subsequently, they were screened and treated, when necessary, at antenatal clinics. Thus, as shown in **Figure 8** the number of RDTs done rose dramatically after 2007. However, it is interesting to see that the proportion of positive tests dropped until 2009, possibly reflecting effective management (ACT) in early stages of the illness, the improved use of intermittent malaria prophylaxis with a concomitant lower reservoir of infected women and widespread distribution and use of bednets.

Fig 8: Pregnant Women: RDTs Done and Proportion RDTs Positive 2006 - 2010

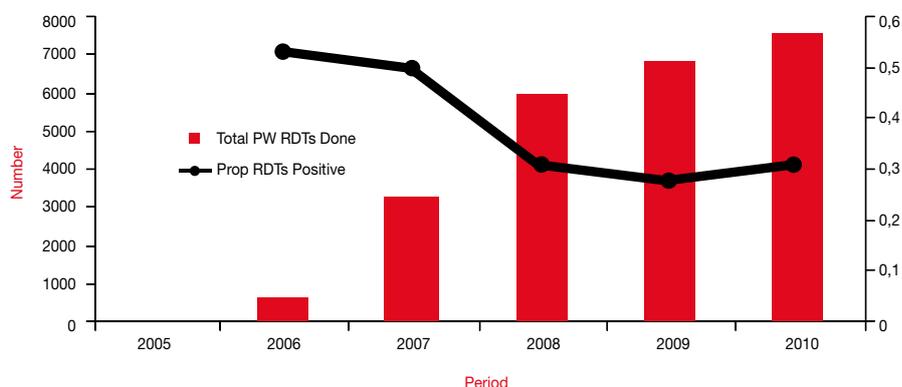


Figure 9 shows the steadily increasing number of severe malaria cases treated in all services. Of interest is the rise in cases from 2009 in those in the 6-13 year age group that benefited from free malaria.

Fig 9: Severe Malaria Cases in Patients ≤5y, 6-13y and ≥14y 2006 - 2010

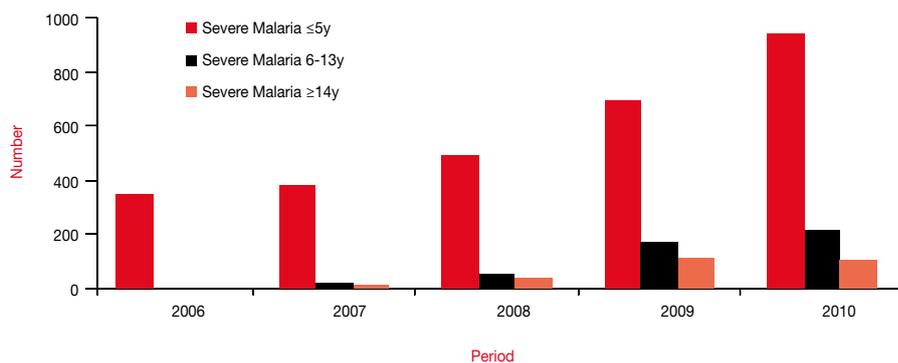
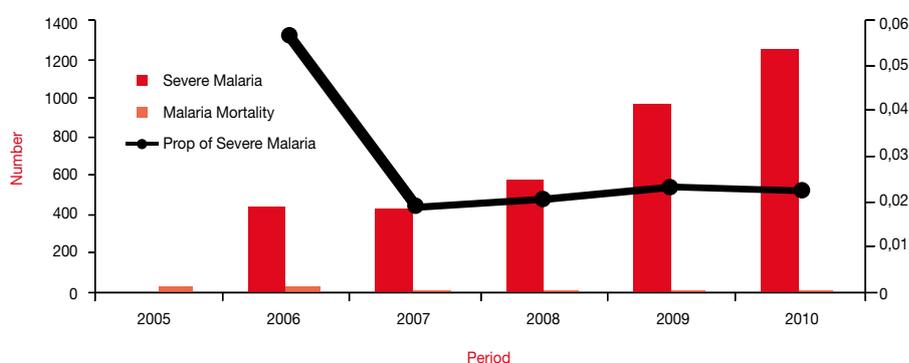


Figure 10 shows the most dramatic results of the project. Despite the rise in number of malaria cases treated, including severe cases, the malaria-related mortality dropped to almost nil (2005 – 28 deaths in seven CSCOMs, 2010 – 14) and the proportion of severe malaria dropped from 6% to 2%. This likely reflects earlier access to treatment (financial and geographic) as well as effective diagnosis and treatment (RDTs and ACT).

Fig 10: Severe Malaria and Malaria-Related Mortality 2006 - 2010



A key element in the safety of village malaria workers (APs) is to have an effective mechanism to deal with patients presenting with fever whose RDT is negative. **Figure 11** shows that along with a rise in number of referrals, there was a steady increase in the percentage of referrals that arrived at the CSCOMs. By 2010, this was over 50%. However, this result should prompt some reflection on whether the referral mechanism was effective. Even in 2010 almost 50% of patients with a fever and a negative RDT did not keep their referral appointment. It is not known what happened to these patients. One might suggest that once malaria was excluded through a negative RDT, a patient would decide to wait to see whether they became sicker before making a journey to a CSCOM that might be expensive (for transport) or difficult (during the rainy season).

Fig 11: Referrals Sent by APs and Percentage Arrived at CSCOMs 2007 - 2010

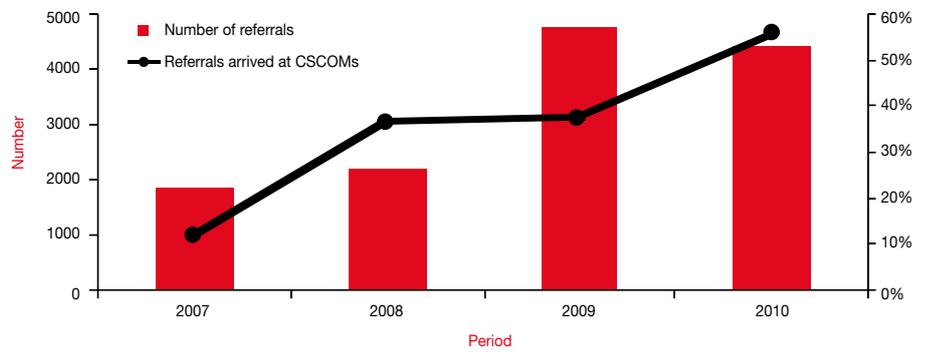


Figure 12 demonstrates clearly that the vast majority of referrals to the CSCOMs by APs were for a fever with a negative RDT. Presumably, the referrals with a positive RDT were “severe malaria” and this proportion was low and dropped during the project’s duration. This may reflect the earlier and effective diagnosis and treatment of malaria in the villages – before it progressed to a severe stage.

Fig 12: Characteristics of AP Referrals 2007 - 2010

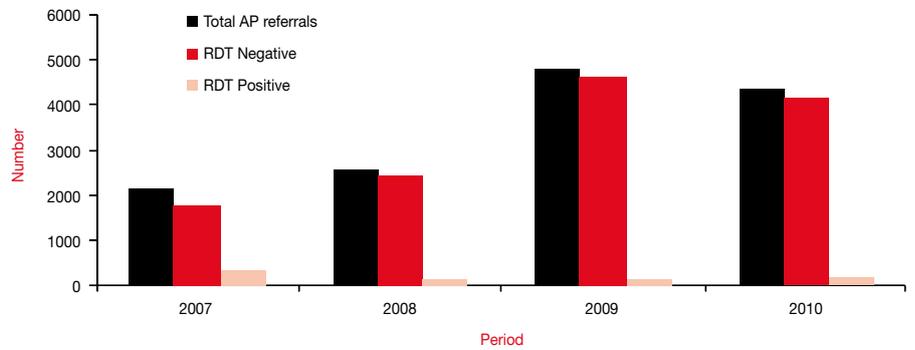


Figure 13 shows attendance rates/patient/year by age group. As expected, with the availability of free malaria diagnosis and treatment and primary care for the ≤5y group, their rate climbed the fastest. Pregnant women seemed to benefit immediately with the provision of free care and given the plateau after 2007, one could suggest that almost all pregnant women, capable of accessing care in the antenatal clinics, were diagnosed and treated effectively.

Fig 13: Attendance Rates All Diagnoses in ≤5y, > 5y and in Pregnant Women 2005 - 2010

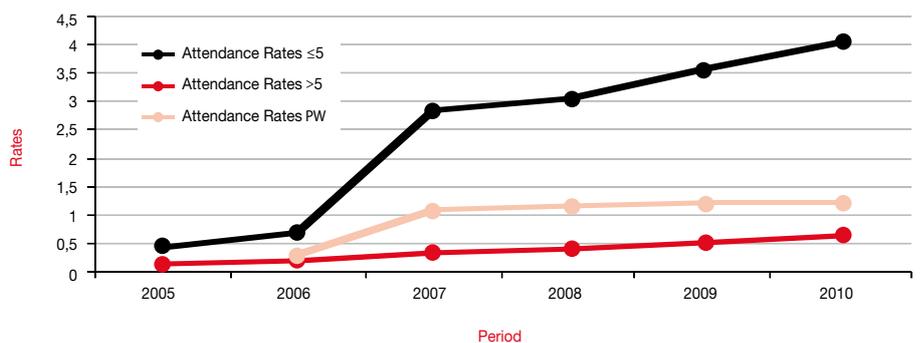
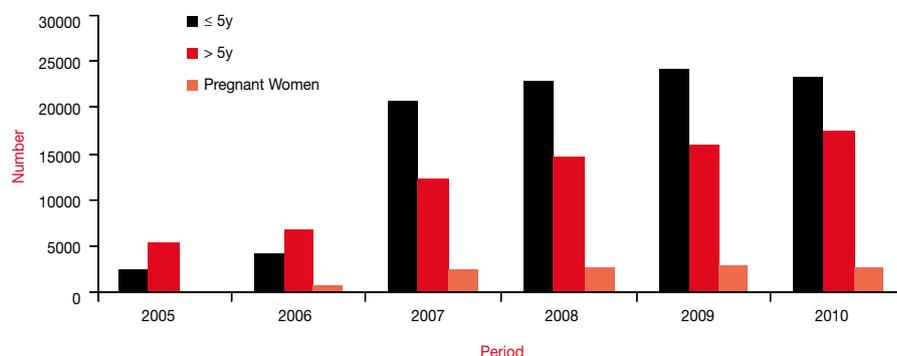


Figure 14 illustrates that providing free primary care for children $\leq 5y$ was effective in increasing access to care. Interestingly, even the patients $>5y$ appeared to benefit from reduced fees (flat fee) after 2007.

Fig 14: Attendance for Other Diagnoses in Patients $\leq 5y$, $>5y$ and Pregnant Women 2005 - 2010



The original goal of the Kangaba project was to reduce mortality and morbidity linked to malaria by making more effective diagnosis and treatment available. MSF planned to gain experience with introducing RDTs and ACTs in a rural area of Mali as a pilot project for the MoH. Part of the strategy was to provide the RDTs and ACT for free or at a reduced price.

In the first two years of the project, RDTs and ACT were introduced, but the uptake by patients was disappointing. After 2007, there was a marked increase in numbers of patients who accessed care, and we believe it was most likely due to the change in strategy that provided increased financial assistance and the introduction of Agents Palu. These two initia-

tives were also associated with a marked drop in mortality due to malaria, one of the original project goals. Without a control district for comparison, we cannot prove that these initiatives were responsible, but the evidence certainly is suggestive.

The effect of providing free or heavily subsidised care has been shown in other contexts to enhance access to care, especially when the majority of the population is living below or close to the poverty line⁽¹⁸⁾. In addition, the combination of free treatment, rapid diagnostics tests and the provision of village malaria workers has been shown to improve malaria outcomes in several other countries such as Sierra Leone and Chad⁽¹⁹⁾. This project in Mali incorporated the same principles and

adds support to the evidence for this approach.

At the same time, it must be noted that the project changed over time with new strategies being added that included modified funding arrangements, extending care to different age groups, health promotion activities, management support to the ASACOs, distribution of bednets and new diagnostic and treatment algorithms. As these were happening, often at overlapping times and without comparison groups, it is not possible to tease out the specific contributions of each intervention. One can only observe marked improvements in malaria care over time.



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9. CONCLUSIONS

The original goals for this project were to increase access for malaria diagnosis and treatment for the vulnerable populations of under-five year old children and pregnant women in Kangaba district and these seem to have been well realised. The dramatic increase in clinic attendance and malaria cases treated from 2007 is impressive. So, too, the drop in mortality documented within the study sites.

We believe this was the result of multiple interventions including effective diagnosis and treatment, reduction in financial and geographical barriers, increased health care management skills in the community, and preventive measures including use of bednets and health promotion in the community.

However, it is noteworthy that the rise in cases treated was only achieved after a serious reassessment of attendance following the original introduction of RDTs and ACT. The expectation that just introducing free RDTs and ACT alone would lead to effective malaria care was shown to be false. Recognising the combined

barriers of lack of finances and remote geography for many inhabitants, the MSF team addressed both in more effective ways. Providing “free access to care”, especially for the vulnerable groups, and using targeted financial support in various aspects of care effectively removed the financial barriers, while the introduction of Agents Palu addressed access to care in remote areas.

MSF was also able to demonstrate the feasibility of bringing the combined approach of RDTs and ACT to the field. Training and supervision in the CSCOMs, CSREFs and non-medical APs led to a rapid uptake of this approach.

Other secondary goals were achieved. Training and supervision of the CSCOMs and ASACOs appeared to bring better quality of care in the health centres and more engagement of the community management elements that, in theory, are meant to give control of health services to local leadership, but often fail due to lack of financial resources and management skills.

Another achievement was acceptance by the population of the benefits of the new diagnostic and treatment regimen. People in the community increasingly came to trust the model of care that reduced the deaths and illness caused by malaria. This was reflected in the rise in clinic attendance rates.

MSF realised these goals with high levels of personnel and financial resources focused on a small area with clear objectives. Of concern in the long term is how the lessons from this pilot project can be incorporated into the routine Malian health system. It is unclear whether Mali will adopt “free access to care” soon, so that perhaps a modified programme should be considered that would require fewer resources but still capture some of the important elements of the current MSF project. In particular, continuing the support and supervision of CSCOMs and ASACOs and ongoing employment of Agents Palu might preserve the gains achieved in malaria control.



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