Partners for Health Reform*plus*

Working Paper

Evaluation of the Impact of Mutual Health Organizations and Information, Education, and Communication on Utilization of Maternal Health Care Services in Bla District, Mali

June 2006

Prepared by:

Lynne Miller Franco, ScD
University Research, LLC

Tania Dmytraczenko, PhD
Abt Associates Inc.

Chieck Hamed Tidane Simpara, MA
Abt Associates Inc.

Clara Burgert, BA
Abt Associates Inc.

Kim Smith, MPA
Consultant, Abt Associates Inc.

This document was produced by PHR*plus* with funding from the US Agency for International Development (USAID) under Project No. 936-5974.13, Contract No. HRN-C-00-00-00019-00 and is in the public domain. The ideas and opinions in this document are the authors' and do not necessarily reflect those of USAID or its employees. Interested parties may use the report in part or whole, providing they maintain the integrity of the report and do not misrepresent its findings or present the work as their own. This and other HFS, PHR, and PHR*plus* documents can be viewed and downloaded on the project website, www.PHRplus.org.

Abt Associates Inc.
4800 Montgomery Lane, Suite 600 ■ Bethesda, Maryland 20814
Tel: 301/913-0500 ■ Fax: 301/652-3916

In collaboration with:
Development Associates, Inc. ■ Emory University Rollins School of Public Health ■ Philoxenia International Travel, Inc. ■ PATH ■ Social Sectors Development Strategies, Inc. ■ Training Resources Group ■ Tulane University School of Public Health and Tropical Medicine ■ University Research Co., LLC.

Order No WP 017

Contributors

The PHR*plus*/ATN Team

Contributor	Role
Abdoulaye Ba	Technical assistance on MHO development, report writing
Clara Burgert	Data cleaning, analysis and report writing
Slavea Chankova	Data analysis and report writing
Francois Diop	Study design
Tania Dmytraczenko	Study design (IEC evaluation component), analysis, and report writing
Lynne Franco	Management of data collection, data analysis, and report writing
Debbie Gueye	Development of IEC messages
Allison Gamble Kelley	Baseline survey, support to implementation of IEC and MHO intervention, and report writing
Marni Lavarentz	Data analysis
Marty Makinen	Study design, report writing
Caroline Quijada	Data analysis, report writing
Najeeb Shafiq	Data analysis
Ousmane Sidibe	Data collection, technical assistance on MHO development, and support for IEC implementation
Cheick HT Simpara	Data collection, technical assistance on MHO development, and report writing
Kimberly Smith	Study design, baseline IEC report, and report writing
K.P. Srinath	Sampling

The Ministry of Health and Others

Contributor	Role
Secretaries General for the Ministry of Health and the Ministry of Social Development, Solidarity and the Aged	Discussion and validation of all Equity Initiative reports in the context of PRODESS
The Director of the Planning and Statistics Unit of the Ministry of Health and the members of the Equity Initiative Steering Committee	Coordination of activities and technical assistance, technical validation of reports
Governors of the Regions of Sikasso and Ségou, the Prefecture, and Commune Mayors	Establishment of steering committees at the local level; participation in validation workshops
Regional Directors for Health, Regional Directors for Social Development and Economic Solidarity for Sikasso and Ségou as well as Social and Health tems in Bla and Sikasso	Involvement and support to all Equity Initiative activities
L'Union Technique de la Mutualité (UTM) (Technical Union for Mutual Health Organizations	General collaboration
MHO management bodies, surveillance committees, and partner NGOs (ASDAP, AMPPF etc.) in the two sites	Implementation and promotion of MHO and IEC/maternal health activities
Village chiefs, other community leaders and the population in the two sites	Collaboration during studies and surveys

Mission

Partners for Health Reformplus is USAID's flagship project for health policy and health system strengthening in developing and transitional countries. The five-year project (2000-2005) builds on the predecessor Partnerships for Health Reform Project, continuing PHR's focus on health policy, financing, and organization, with new emphasis on community participation, infectious disease surveillance, and information systems that support the management and delivery of appropriate health services. PHRplus will focus on the following results:

- *Implementation of appropriate health system reform.*
- *Generation of new financing for health care, as well as more effective use of existing funds.*
- *Design and implementation of health information systems for disease surveillance.*
- *Delivery of quality services by health workers.*
- *Availability and appropriate use of health commodities.*

June 2006

Recommended Citation

Franco, Lynne Miller, Tania Dmytraczenko, Chieck Hamed Tidane Simpara, Clara Burgert, and Kim Smith. June 2006. *Evaluation of the Impact of Mutual Health Organizations and Information, Education, and Communication on Utilization of Maternal Health Care Services in Bla District, Mali.* Bethesda, MD: The Partners for Health Reform*plus* Project, Abt Associates Inc.

For additional copies of this report, contact the PHR*plus* Resource Center at PHR-InfoCenter@abtassoc.com or visit our website at www.PHRplus.org.

Contract/Project No.: HRN-C-00-00-00019-00

Submitted to: USAID/[for what Mission (Capital City)?]

and: Karen Cavanaugh, CTO
Health Systems Division
Office of Health, Infectious Disease and Nutrition
Center for Population, Health and Nutrition
Bureau for Global Programs, Field Support and Research
United States Agency for International Development

Abstract

This report presents the results from an evaluation study on the effects of two demand-side interventions on use of maternal health services in one district in Mali: mutual health organizations (MHO) and an information, education, and communication (IEC) campaign. Cross-sectional household surveys were conducted in 2003 and 2004 (428 and 1,617 women of reproductive age interviewed respectively). Exposure to intensive IEC showed significant impact on early antenatal care and nearly significant impact on delivery in a modern facility. Enrollment in an MHO contributed to early use of antenatal care, though small sample size reduced the power to detect the effect of MHO beneficiary status on deliveries. Active household MHO membership was a significant determinant of lower out-of-pocket payments for maternal health, and exposure to a radio message or intensive media was a significant predictor of knowledge of key maternal health messages.

Table of Contents

List of Tables

List of Figures

Acronyms

ATN	Programme Santé USAID/Assistance Technique Nationale
CSCom	Community Health Center (*Centre de Santé Communautaire*)
HIV/AIDS	Human Immuno-Virus/Acquired Immuno-Deficiency Syndrome
HH	Household
IEC	Information, education, and communication
MHO	Mutual Health Organization
MOH	Ministry of Health
NGO	Nongovernmental organization
SES	Socioeconomic status
PHR	Partnerships for Health Reform project
PHR*plus*	Partners for Health Reform*plus* project
UN	United Nations
UNICEF	United Nations Children's Fund
UNFPA	United Nations Fund for Population Activities
USAID	United States Agency for International Development
WHO	World Health Organization

Acknowledgments

The opinions expressed herein are those of the authors and do not necessarily reflect the views of the U.S. Agency for International Development. The authors would like to acknowledge the extensive contribution to the interventions and the evaluation survey of Mr. Ousmane Sidibé, who passed away before the survey data was analyzed.

In addition, the authors would like to thank the managers of the Blaville and Kéméni mutual health organizations for their efforts and openness, and the Equity Initiative Steering Committee, led by Cellule de Planification et de Statistique especially from the Ministry of Health, Ministry of Social Development, Solidarity, and Elderly, and their regional and local services for their guidance and input into the design and support for interventions.

Executive Summary

Background

The Millennium Development Goal to reduce maternal mortality by three-quarters between 1990 and 2015 will not be met without substantial improvement in maternal health in Sub-Saharan Africa. Many maternal deaths in this region could be averted through increased access to and use of quality pregnancy-related care. This study was designed to evaluate the independent and combined effect of two demand-side interventions, mutual health organizations (MHO), and an information, education, and communication (IEC) campaign, on use of maternal health services in one district in Mali.

Methods

MHO and IEC interventions were implemented between 2003 and 2004 in the district of Bla, located in the Segou region of Mali. One urban and seven rural areas of Bla were included in the study, with each area receiving either MHO, IEC, both, or no intervention during the study period. The study is based on cross-sectional household surveys conducted in 2003 and 2004 (428 and 1,617 women of reproductive age interviewed, respectively). The primary outcome measures were utilization of early antenatal care (first trimester), routine antenatal care (four or more visits), and delivery in a modern heath facility. Individual, household, and health system-related factors that may account for differences in use of pregnancy-related care were also examined.

Findings

Exposure to intensive IEC showed significant impact on early antenatal care (odds ratio 1.96 [95% CI 1.15-3.35]) and delivery in a modern facility (odds ratio 1.86 [90% CI 0.97-3.58]). Enrollment in an MHO only contributed to early use of antenatal care (odds ratio 2.48 [90% CI 0.92-6.71]). A small subsample size in the comparison group of women MHO beneficiaries who did not deliver in a modern facility reduced the power to detect the effect of MHO beneficiary status on utilization of deliveries. Active household membership in an MHO was a significant determinant of lower out-of-pocket payments for health (coefficient –0.42 [99% CI -0.71- -0.12]) and women's beneficiary status was a significant negative predictor of higher out-of-pocket payments for delivery (coefficient –1.05 [99% CI –1.82- -0.27]). Exposure to a radio message or intensive media message was a significant predictor of knowledge of key maternal health messages, such as vaginal bleeding as a postpartum danger sign (odds ratio 1.50 [95% CI 1.10-2.07]), among others.

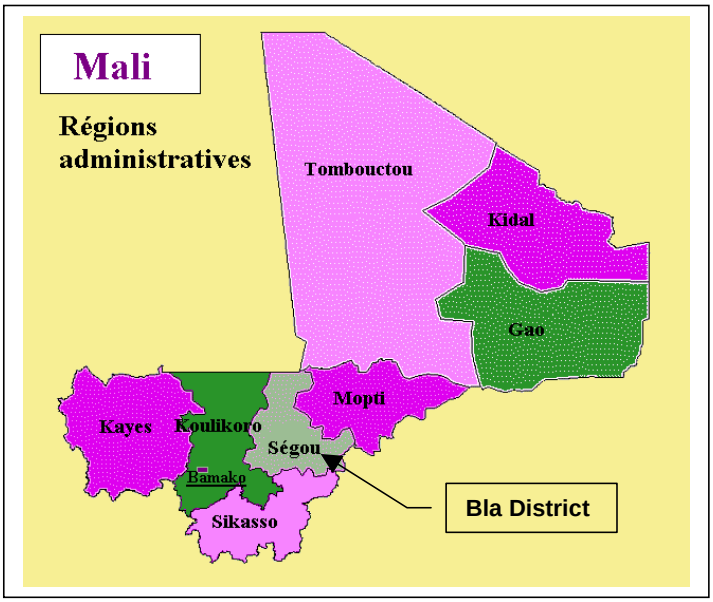
Implications

The demand-side interventions studied—MHO and IEC—have the potential to impact utilization of maternal health services.

1. Introduction

Each year over half a million women die during childbirth and an additional 50 million or more experience pregnancy-related complications in developing countries (Tsui et al, 1997; WHO, UNICEF, UNFPA, 2003). Despite the Millennium Development Goal to reduce maternal mortality worldwide by three-quarters by 2015, progress remains slow in the most affected countries (UN, 2005). With only one exception, countries with the highest obstetric risk at birth are in Africa. Women in Sub-Saharan Africa face a 1 in 13 chance of dying from pregnancy-related causes, compared to 1 in 4,085 in industrialized countries; Mali ranks eighth among countries with the worst maternal mortality rates (WHO, UNICEF, UNFPA, 2003). Major causes of maternal deaths in Africa are hemorrhage, sepsis/infection, hypertension, and HIV/AIDS (Khan et al, 2006). In Mali, as in all developing countries, many of these deaths and disabilities can be prevented through increased access to and utilization of quality basic care during pregnancy, referral for complications, and essential obstetric care, as well as family planning to prevent unwanted pregnancy (Koblinsky et al, 2003; Nanda et al, 2005). Two key interventions for preventing maternal deaths are adequate and early antenatal care to ensure recognition and prevention of risks during pregnancy and delivery with a skilled birth attendant who can identify risks during delivery and arrange transportation for emergency obstetrical services (Lule et al, 2005).

Figure 1: Map of Mali



Despite awareness of the importance and cost-effectiveness of these services, use remains low in developing countries (Freedman et al, 2005). In Mali, 57 percent of pregnant women make at least one antenatal care visit, but less than one-third of these visits occur in the first trimester; fewer than 25 percent of women in rural areas give birth with the assistance of skilled attendants (PSU/MOH/Mali, 2001). Given the need for skilled attendance at birth and adequate antenatal care,

the international community has been searching for ways to increase utilization of these services. A fair amount of knowledge exists about factors that facilitate or inhibit their use. Certain individual characteristics such as low educational level of the woman (and her spouse/head of household), low economic status, high parity, and limited female autonomy have been consistently identified as inhibiting factors in studies worldwide (Bhatia and Cleland, 1995; Celik and Hotchkiss, 2000; Becker et al, 1993; Goldman and Pebley, 1994; Magadi et al, 2000). In some studies, religion and ethnicity have also been shown to have a significant impact (PSU/MOH/Mali, 2001; Bhatia and Cleland, 1995; Becker et al, 1993; Goldman and Pebley, 1994). Health system characteristics also influence utilization. In some cases, access had an impact, and sometimes not (Nanda et al, 2005). Lack of knowledge (Stekelenburg et al, 2004) and types of obstetrical experiences (Glei et al, 2002) also affected use of maternal health services. In other cases, user fees and lack of health insurance were determined to be barriers (Bhatia and Cleland, 1995; Nanda, 2002; Schneider and Hanson, 2006). While many of the barriers to the use of maternal health services are independent of the health system (e.g., parity, education, low economic status, religion), there are many barriers that health systems interventions could address: financial and geographic access, perceived and actual quality of care, and knowledge and attitudes on the importance of maternal health services (Freedman et al, 2005). This study will focus on financial and knowledge barriers to use of maternal health services.

1.1 Financial Barriers

With regards to financial barriers, donors and governments in West Africa and around the world are increasingly looking to mutual health organizations (MHOs) as a means of expanding access to health care and reducing the economic burden of illness in developing countries (Ekman, 2004). MHO is a general term that refers to voluntary, non-profit health insurance schemes organized and managed at the community level. Like traditional health insurance, they are based on the principle of risk-pooling and involve regular payments of a small premium in exchange for reducing the out-of-pocket payment of a health service to zero or a nominal co-payment at the time of service (Bennett et al, 2004). By reducing financial barriers to care, MHO schemes are viewed as a way of increasing access to—and ultimately use of—these priority health services. Despite emerging literature on MHOs (Arhin-Tenkorang, 2001), to date, little information is available on the extent to which priority maternal health services are covered by these schemes and whether MHO membership influences demand and household decisions about use of these services (Schneider et al, 2001; Tabor, 2005).

1.2 Knowledge Barriers

Another common strategy for increasing use of maternal health services, focusing on generating demand for care, is information, education, and communication (IEC)-based programs. Evidence to date indicates relatively little impact from the use of mass media campaigns alone on maternal health services, particularly in poor, rural areas (Bhatia and Cleland, 1995). However, integrated with person-to-person and “traditional” or “indigenous” methods such as theatrical sketches and village animators, IEC has shown its effectiveness in changing utilization of maternal services (Clift, 2001; Clemmons and Coulibaly, 1999; Mandandhar et al, 2004).

This study was undertaken to examine the impact of two specific interventions to address hypothesized key barriers to the access and utilization of maternal health services: 1) MHOs to reduce financial barriers at the time of care for deliveries and antenatal care, and 2) IEC campaigns that include radio, traditional theatre, and person-to-person interactions to remove barriers of knowledge among women of reproductive age and their partners/household heads. The paper examines the effect of these demand-side interventions on barriers to use of maternal heath care in Mali, both as an effort

to help women living there and to contribute to the knowledge base about how to accelerate progress toward meeting the Millennium Development Goal related to maternal health. A quasi-experimental design was used to test the independent and combined effects of MHOs and IEC interventions on the use of maternal health services in Bla District in rural Mali.

Section 2 describes the situation analysis, design, and implementation of interventions. Section 3 presents the research methodology. Section 4 discusses the findings related to the effects of IEC and MHOs on use of maternal care, the predictors of maternal health care expenditures, and the predictors of MHO membership for women of reproductive age and of knowledge of maternal health issues. Section 5 presents some conclusions and areas for further research.

2. Situation Analysis and Interventions

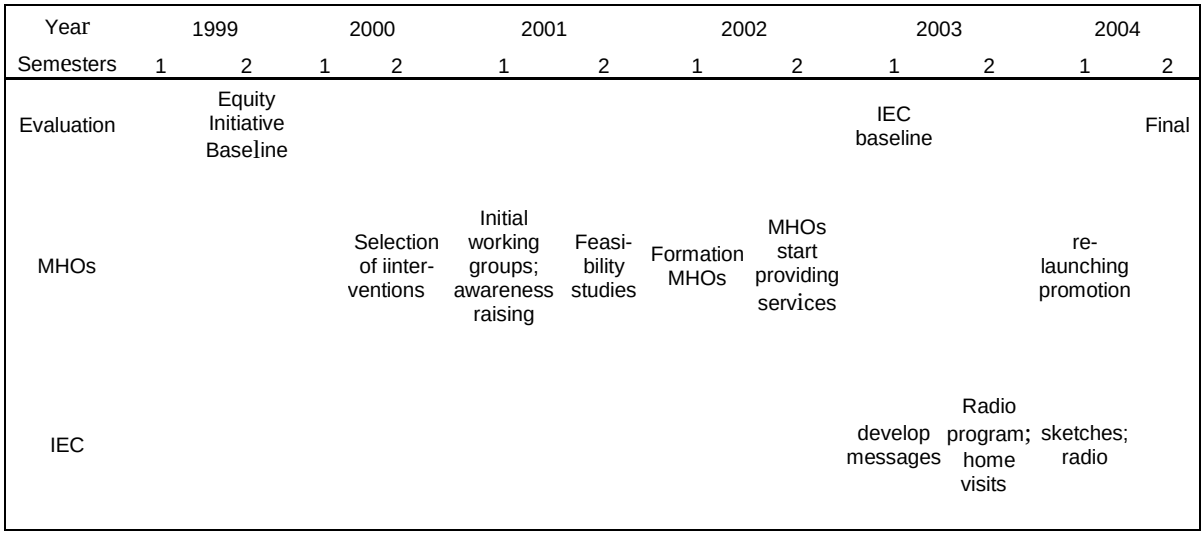
2.1 Overview

The study described in this report built on initial work conducted under the Equity Initiative, a research-action project funded by USAID in Mali. In 1999, the Equity Initiative in Mali, under the predecessor Partnerships for Health Reform (PHR) project, conducted a survey to examine the factors affecting access to and use of health services in two pilot sites in Mali: the rural district of Bla in the region of Ségou and the urban commune of Sikasso in the region of Sikasso (Gamble Kelley et al, 2001).

Since the completion of the 1999 study, using the survey results as a base, the Equity Initiative has been working with communities in Bla and Sikasso to develop and implement strategies to address barriers to care identified through the survey. One of the interventions that the community selected is community-based health insurance, known as MHOs, as a means of making health care more financially accessible to the population. MHOs are voluntary membership organizations providing health insurance services to their members, and they are owned, designed, and managed by the community that they serve. Members pay a small premium on a regular basis to offset the risk of having to pay for high health care costs in case of illness, injury, childbirth, or another event requiring expensive medical services. MHOs differ from commercial insurance organizations in several ways, most importantly, in two areas: they are always not-for-profit and are based on the ethic principles of mutual aid and social solidarity (Bennett et al, 2004). Four MHOs were set up with PHR assistance, and they have been enrolling members in selected areas of Bla and in Sikasso since 2002.

In 2003, additional funds from USAID Strategic Objective 2 through the Partners for Health Reform*plus* (PHR*plus*) project were available to focus on maternal health issues, and work began on addressing additional barriers to utilization of maternal care in Bla District through implementation of an IEC intervention. The IEC intervention aimed at increasing awareness of and knowledge about safe motherhood practices and, ultimately, service utilization. In addition, the existence of the MHO and IEC interventions in select areas of Bla enabled PHR*plus* to explore the relative and synergistic impact of financing and knowledge-building interventions on use of pregnancy-related care. Figure 2 shows the sequencing of events through the evaluation of these interventions.

Figure 2: Timeline of Evaluation and Interventions



2.2 Issues Related to Maternal Health from the Situation Analysis of 1999

The Equity Initiative 1999 study findings highlighted geographic and socioeconomic disparities in utilization of maternal health care. Use of prenatal care and skilled attendance during delivery were found to be significantly lower in Bla than in Sikasso. Sixty-one percent of women in Bla reported at least one prenatal visit during their last pregnancy versus 87 percent in Sikasso, and only half of the women surveyed in Bla delivered their last child with the assistance of a skilled attendant versus over 90 percent in Sikasso. Particularly in Bla, women in the poorest quintile were significantly less likely to have an assisted delivery than women in richest income quintiles.

The survey, however, also found that use of postnatal services was low and approximately the same in both the rural and urban sites and across socioeconomic groups. Only 36 percent of women surveyed had sought postnatal care after the delivery of their last child (40 percent in Sikasso and 35 percent in Bla). Two of the main reasons cited for not seeking prenatal and postnatal care were economic factors (the respondent considered the cost of the service too high or did not have health insurance) and lack of need. An additional 25 percent of women surveyed stated that they did not seek postnatal care because there was no need to do so (Gamble Kelley et al, 2001).

2.3 Findings of the IEC Baseline Survey in 2003

A household survey and focus group discussions were conducted in 2003 to provide baseline information on knowledge of maternal health issues, access to various media that could be used for IEC, and utilization levels for maternal health services. Specific methods and additional details on results can be found in the baseline survey report (Smith et al, 2004). Below is a summary of key results.

Most women and household heads were aware of the importance of maternal health services, particularly prenatal care and skilled assistance at delivery, to the health of the mother and child. Levels of more in-depth knowledge about care during pregnancy, including the timing and frequency

of prenatal visits and danger signs, were moderately high overall, and particularly when compared to knowledge about postnatal care. Almost no women and less than one-fifth of household heads were aware that the first postnatal visit should occur within the first week after delivery.

A large minority of women and household heads reported that they had been exposed to maternal health messages within the three months preceding the survey. Most had heard messages focused on prenatal care, either the general importance of prenatal care, the importance of specific services received during a prenatal visit (tetanus vaccination, iron tables, or malaria prophylaxis), or diet and nutrition during pregnancy. Very few respondents reported hearing messages related to delivery or postnatal care.

Women and household heads interviewed received information on maternal health from different sources. Radio was the most frequently cited source among women versus a relative or friend cited among household heads. Even though survey responses suggest that household heads tend to listen to the radio more frequently than women, the radio was cited as a source of information on maternal health by only 18 percent of household heads versus 50 percent of women interviewed. In addition to radio, women tend to seek information from health workers, and men seek it from family and friends. Among all respondents, however, facility-based and community health workers are considered the most credible sources of information.

Use of prenatal care services was high in Bla in 2003, with over 70 percent of women interviewed stating that they sought prenatal care during their last pregnancy. In contrast, only 52 percent of women gave birth to their last child with the assistance of a skilled health worker, and only 33 percent of women sought postnatal care after their last delivery. Respondents' greater recent exposure to information related to prenatal care versus delivery and postnatal care suggests that IEC may have an impact on maternal health care behaviors.

The discrepancy between perceptions of the importance of maternal health services and actual use suggested that women in Bla face barriers to utilization of these services. The survey found that household heads and husbands were the primary decision makers regarding maternal health care, and that they tended to have similar perceptions of and knowledge about maternal health care as the women interviewed. However, financial and information constraints may have affected the ability of household heads to make care-seeking decisions that are best for women's health during and after pregnancy.

2.4 Implementing the Interventions

2.4.1 MHO Intervention in Bla District

From January 2001 to April 2002, PHR*plus* supported the administrative and functional establishment of two MHOs in Bla District: *Lafia de Blaville* is located in the town of Bla and its surrounding villages, and *Danaya de Kéméni* is in the village and hamlets of Kemeni, both in Bla District. The following are the main characteristics of these MHOs:

- Community-based MHO, created within a geographic community, and not related to any specific professional group

- Family membership
- Decentralized management with small offices in villages or neighborhoods surrounding the site of the main management office
- Benefits package covering all services in the minimum package of activities and, in some cases, hospitalization (Blaville)
- Reproductive health services covered (family planning, antenatal care, post-natal care, tetanus vaccination for pregnant women, simple deliveries, and complicated deliveries)
- Commitment by mutual members to utilize preventive care, such as antenatal care, vaccinations, and insecticide-treated bednets
- Agreements/conventions with a total of 11 public health care providers (one regional hospital, two referral health centers, and eight community health centers)

By 2002, households living in and around Bla Town could join the Blaville MHO and those living in the Kemeni subdistrict could join the Kemeni MHO. Members paid $2.08[1] for a one-time enrollment fee and a monthly or annual premium to the MHO. The Blaville MHO charged a premium of $0.54 per beneficiary per month while the Kemeni MHO charged $0.32 per beneficiary per month, or allowed for an annual payment to be made after the cotton harvest. The MHOs signed agreements with several health facilities and reimburse members for services used. Thus when members or their beneficiaries need curative care, antenatal care, and normal deliveries and are up-to-date on their premium payments, they pay 25 percent of the fee-for-service, and the MHO covers the remaining 75 percent. For complicated deliveries, the MHOs cover 100 percent of the fee. Services for the Blaville MHO are covered at the District Referral Health Center and at the Bla Community Health Center. For the Kemeni MHO, services are covered at the Kemeni Community Health Center.

By September 2004, the Blaville MHO had 218 members (households with at least one individual member) and 875 beneficiaries (individuals covered), mostly from the town of Bla (population of about 15,000). The Kemeni MHO (in the rural area, and covering a population of about 9,000) had 126 members and 374 beneficiaries.[2]

2.4.2 IEC Intervention

Households living in specific areas of Bla District were exposed to a variety of media for key maternal health messages. These messages, based on the Mali Ministry of Health policies and norms, focused on early (starting in the first trimester) and routine (four or more visits) use of antenatal care, recognition of four danger signs during pregnancy (fever, edema, difficulty breathing, and bleeding) and after delivery (vaginal bleeding), delivery at a health facility, sleeping under an insecticide-treated net during pregnancy, use of malaria prophylaxis during pregnancy, and the importance of postnatal care and birth spacing. Messages and media targeted both men and women. Messages were transmitted from mid 2003 to early 2004, through radio spots on community radio twice a day over a period of five months, home visits by village animators, group health talks, and sketches (traditional

[1] All monetary amounts are converted from F CFA at an exchange rate of 480 F CFA = $US 1, the rate at the time of the survey.
[2] More detailed analysis of MHO functioning is available in Franco et al. (2006).

theater) performed twice a day in 37 villages over a period nine days. The IEC campaign focused in Yangasso (with no MHO)[3] and in the rural villages surrounding Bla Town, which had access to the Blaville MHO (see Annex A for detailed description of the design and implementation IEC intervention).

[3] Yangasso was chosen for the IEC intervention because it was generally representative of the rural areas in Bla District, had no MHO operating in its area, and thus would be a good comparison group.

3. Survey Methodology

3.1 Study Design and Sampling

The total population of Bla District, located in the Ségou region, was estimated at 236,000 for 2004. Within the district, interventions were implemented as follows:

- MHO intervention: Bla Town, rural villages surrounding Bla Town, Kemeni
- IEC intervention: Yangasso, rural villages surrounding Bla Town

The study design was set up to be a quasi-experimental design. Data were collected in the intervention areas, as well as in Fani, Naimana, Falo, and the remaining parts of Bla central. Only two areas in Bla District were excluded from the sampling (Touna and Diaramana) as MHOs had been established there in late 2003 but were too young to be evaluated as part of the survey.

During 2003-2004, the Ministry of Health and other projects implemented additional multimedia IEC campaigns in the district. For this reason, the analysis did not compare exposure to control areas but instead used as a unit of analysis respondents' answers to whether and through what media they had heard a message concerning maternal health. Further, because the study's aim was to evaluate the effect of IEC interventions in general, the variable of interest was exposure to any maternal health message in the last 12 months, rather than exposure to the specific campaign implemented.

The evaluation of the impact of IEC and MHOs on barriers to access and use of maternal care was based on two household surveys: a baseline survey conducted in early 2003 (Smith et al, 2004) and final household survey conducted in late 2004. These two surveys collected data at household and individual levels on socioeconomic status (SES), self-reported distance to the nearest health facility, utilization of health services (including maternal health care), reasons for non-utilization, and knowledge of maternal health issues; for the 2004 survey only, data collected also included exposure to IEC messages and media and MHO membership status. The 2003 survey did not target MHO members because MHOs had been operational for only a few months and membership size did not justify a separate analysis. Table 1 compares the 2003 and 2004 surveys.

Both surveys used similar sampling methods, based on a random selection of enumeration areas, an updated mapping of all households in the selected enumeration areas, and systematic selection of individual households based on a random start. All women of reproductive age in the household were interviewed. In the final survey, in addition to this method of selecting non-member households, all MHO member households were targeted for the 2004 survey. The list of households was derived from the MHO registers; 69 percent of Blaville and 93 percent of Kemeni member households were actually located and interviewed. Of the 1,285 households interviewed in the final 2004 survey, 268 were MHO member households. Table 1 shows resulting sample sizes for the baseline and final surveys organized according to whether respondents lived in a zone where 1) MHOs existed, 2) IEC campaigns were active, 3) both situations occurred, and 4) neither occurred.

Table 1: Samples of Women 15-49 in 2003 and 2004 Final Survey

ZONE	2003 Survey	2004 Final Survey
1) MHO existed in area & no IEC campaigns active	**83**	**286**
Lived in MHO area but not a member	--	188
Beneficiary of an MHO	--	98
2) IEC campaigns active & no MHO existed in area	**205**	**532**
IEC intensive* campaign active but heard no message	--	216
IEC intensive campaign active AND heard one intensive IEC message	--	316
3) MHO existed in area & IEC campaigns active	**177**	**512**
Lived in MHO area & IEC intensive campaign active but neither member nor heard an intensive IEC message	--	79
Beneficiary of an MHO & did not hear one intensive IEC message	--	6
Lived in MHO area & heard one intensive IEC message	--	272
Beneficiary of an MHO & heard one intensive IEC message	--	155
4) No MHO existed & no IEC campaign was active	**128**	**287**
TOTAL OVERALL SAMPLE	428	1,617

*Intensive message refers to use of traditional theater, group health education, or a home visit

Data from MHOs concerning membership and premium payments were compiled directly from MHO registers. These data were linked electronically to the household survey data through unique household identifiers. Data entry was conducted using ACCESS data entry screens. All data manipulation and analysis was performed using Intercooled Stata 8.0.

3.2 Statistical Analysis

Multivariate statistical analysis was done using Stata's survey logit regression function to ascertain whether being an MHO beneficiary and/or having heard an intensive IEC message were predictors of higher utilization of priority maternal health services. The dependent variables of interest were utilization of early antenatal care (first trimester), routine antenatal care (four plus visits), and delivery in a modern facility (public, private, missionary health centers, maternities, or hospitals).[4] This is a supply-side issue, however, while this study is focused on demand-side interventions. Two main types of independent variables were considered: those that cannot be addressed by health system interventions and those that can. The first type included education of the woman and head of household, gender of head of household, woman's participation in health care decisions, ethnic group, and SES. Independent variables that can be addressed by health system interventions included 1) whether the woman was a beneficiary of an MHO and 2) whether she had heard at least one intensive IEC message; an interaction variable was added to measure the combined effect. Finally, a supply-side independent variable—distance to closest health facility—was added.

[4] The authors recognize that not all modern facilities in Mali are equipped with skilled birth attendants according to the WHO definition.

It should be noted that the sample the final survey used in this multivariate analysis was 409 women for which all data were available on their antenatal period, and 306 women for which data were available concerning their delivery (103 women were not asked about delivery due to an error in administration of the questionnaire). Of the 306 women, 39 (including only one MHO beneficiary) suffered complications during or following delivery (of which 38 percent experienced bleeding, 36 percent showed signs of eclampsia, and 7 percent experienced infection). Although MHO beneficiaries are covered 100 percent for charges for a cesarean, the seven women who delivered by cesarean section in this sample were all non-MHO members. Thus, no analysis of specific effects of MHOs on catastrophic delivery costs was possible.

In addition, statistical analysis was done to confirm that, as postulated in the literature, the demand-side interventions being evaluated in the study zone—namely, MHOs and IEC—had the effect of alleviating financial and knowledge barriers, respectively. A multivariate linear regression was used to determine whether participation in an MHO indeed translated into lower out-of-pocket payments for health services, both for the household overall and for women specifically who delivered in the 12 months prior to the survey. Further analysis was conducted to establish determinants of MHO beneficiary status. To confirm that IEC campaigns were a predictor of knowledge, a multivariate logit regression was conducted. Two measures of exposure to the IEC interventions were used: 1) having being exposed to ("heard") an IEC message on maternal health in the previous 12 months through any intensive media, such as traditional theater, group health education, or a home visit, and 2) exposure through the radio.

Household data were weighted by the inverse of the probability of selection at the household level, and weights were incorporated into all subsequent analyses. Non-MHO households were weighted based on the probability of the enumeration section being selected and on the probability of a household being selected in that enumeration area. The base sampling weight for MHO households, for which a complete sample was sought, was adjusted for non-response.

SES was measured by an approximation of consumption (instead of revenue/income), as is commonly done in low-resource settings where the non-cash economy is large, a substantial share of production is non-market, and the vast majority of household production is consumed (Deaton and Zaidi, 2002). The interviewers asked the head of household a series of questions related to food consumption, transportation, lodging, utilities (e.g., water, electricity, combustibles), school fees, health, and clothing. The questions were adapted to appropriate recall intervals: for example, lodging costs were estimated for the previous month, school expenses for the previous school year, and food for the previous week. Questions about consumption of household-produced foods were especially important, as this was often a large portion of consumed foods. All estimations were then annualized and summarized for the household in order to develop the SES of each household. This total SES was then adjusted for household size, by dividing it by the total # of adults (≥ 14) + (children < 14)*75%.

Using this last calculation (household consumption adjusted for household size), terciles were developed such that three equally sized groups were formed. Tercile 1 represents the poorest (33.3 percent of households with the lowest level of per capita consumption) and Tercile 3, the richest (33.3 percent of households with the highest level of per capita consumption). These terciles were used to compare health needs, utilization of health services, and health care expenditures across income groups.

4. Results

4.1 The Women in the Study

Table 2 presents characteristics of the sample, from the 2003 and 2004 surveys, and indicates that the samples are generally comparable, with the exception of education of the head of household, which was higher in the 2004 survey. The overall sample of women 15-49 years old, and the subset of those women who delivered in the previous 12 months, are also comparable.

4.2 Levels of Utilization of Maternal Health Services

A comparison in use of antenatal care shows improvement, from 61 percent in Bla in 1999 (Gamble Kelly et al 2001) to 71 percent in 2003 and 69 percent in 2004. However, little improvement has been seen in women who had four or more antenatal visits in Bla District since 1999, with the rate staying around 30 percent. Deliveries in modern facilities appear to have increased since 1999 in Bla District overall (ranging from 32 to 58 percent), but stabilized between 2003 and 2004 at about 53 percent.

Table 3 presents the predictors of utilization of antenatal and delivery services. Exposure to the intensive IEC intervention showed significant impact on early antenatal care and delivery (odds ratios 1.96 and 1.86, respectively). It appears that enrollment in an MHO only contributed to early use of antenatal care (odds ratio 2.48). However, it should be noted that the small subsample of the comparison group—MHO beneficiaries who did not deliver in a modern facility (only one)—reduced the power to detect the effects of MHO beneficiary status and the interaction variable on utilization. Another health systems indicator, geographical access as measured by distance, showed a significant negative impact across the board: the farther one lives from a health facility, the less likely one is to use maternal health services, especially delivery care. Contrary to results from other studies, involvement of the woman in decisions on her health care had a negative impact on use of early antenatal care (odds ratio 0.15). This may be due to a confounding factor; these women are more likely to work outside the home and thus may have other barriers to seeking care (such as time limitations).

Table 2: Sample Characteristics of Women

		2003 survey women age 15-49 N=428	2004 final survey women age 15-49 N=1,617	2004 final survey women delivering N=466*
Mean age		29	29	28
Age	<= 19	20%	19%	24%
	20 to 34	47%	53%	68%
	35 & older	33%	29%	19%
Female education	No ed	82%	69%	74%
	Primary	17%	28%	25%
	Secondary	1%	3%	2%
Ethnic group	Bambara	64%	51%	55%
	Senofo	16%	15%	16%
	Other	20%	34%	29%
Female-headed HH	Yes	1%	5%	4%
	No	99%	95%	96%
Religion	Muslim	96%	95%	96%
	Other	4%	5%	4%
Head of HH's education	No ed	78%	45%	45%
	Primary	17%	44%	47%
	Secondary	5%	11%	8%
Woman participates in health care decision	Yes	N/A**	7%	6%
	No	N/A	93%	94%
Distance to health facility	1 km or less	N/A	51%	42%
	2 to 5 km	N/A	19%	20%
	6 to 10 km	N/A	23%	24%
	11 or more km	N/A	8%	13%
Residence	Rural	N/A	79%	83%
	Urban	N/A	21%	17%
Access to MHO	Yes	N/A	49%	47%
	No	N/A	51%	53%
Access to intensive IEC	Yes	N/A	34%	35%
	No	N/A	66%	65%
Access to radio IEC	Yes	N/A	89%	88%
	No	N/A	11%	12%
Mean per capita income* **		N/A	$83.57	$80.35
Mean per capita income by SES	Poor	N/A	$26.25	$24.07
	Middle	N/A	$62.86	$64.07
	Richest	N/A	$193.52	$173.64

*60 women are dropped in the multivariate analysis due to missing variables

** N/A means "Not Applicable"

*** Mean income is calculated based on family consumption divided by household size, based on 480 FCFA=$1 US.

Table 3: Predictors of Utilization of Maternal Health Services among Women Delivering in the Previous 12 Months

N=466	Early antenatal care (n=409)			4+ antenatal visits (n=409)			Delivery in modern facility (n=272)		
Household, Head of Household, and Women Characteristics	**Odds ratio**	**Confidence interval**	**P-value**	**Odds ratio**	**Confidence interval**	**P-value**	**Odds ratio**	**Confidence interval**	**P-value**
Beneficiary for MHO services	2.479	0.915-6.713	0.074	2.247	0.809-6.239	0.120	2.504	0.274-22.874	0.415
Heard at least intensive IEC message	1.962	1.150-3.350	0.013	1.227	0.702-2.143	0.472	1.863	0.970-3.578	0.062
Interaction between MHO & IEC	0.948	0.239-3.757	0.939	0.499	0.135-1.840	0.296	0.503	0.021-12.069	0.671
Access to health facility (R= <=1 km)									
2-5 kms	0.742	0.375-1.468	0.391	0.359	0.172-0.747	0.006	0.235	0.093-0.594	0.002
6-10 kms	0.279	0.138-0.567	0.000	0.224	0.108-0.466	0.000	0.128	0.054-0.305	0.000
11+ kms	0.677	0.287-1.593	0.371	0.942	0.419-2.118	0.885	0.175	0.063-0.485	0.001
Education of woman (R= no educ.)									
Primary or higher	1.029	0.537-1.970	0.931	1.037	0.529-2.034	0.915	1.177	0.567-2.445	0.661
Education of HH head (R=no educ)									
Primary or higher	0.950	0.557-1.623	0.852	1.223	0.710-2.108	0.467	1.358	0.692-2.667	0.373
Head of household (R=male)									
Female	3.342	0.450-24.821	0.238	0.896	0.130-6.186	0.911	Dropped		
Woman participates in health care decisions (R=no)									
Woman participates	0.149	0.037-0.592	0.007	0.560	0.173-1.814	0.333	1.813	0.543-6.046	0.333
Ethnic group (R = Bambara)									
Senofo	1.059	0.482-2.326	0.886	1.459	0.655-3.252	0.355	1.819	0.736-4.495	0.194
Other	0.584	0.296-1.152	0.121	1.012	0.524-1.955	0.971	2.302	1.026-5.167	0.043
HH wealth (R=poor)									
Middle	1.22	0.654-2.292	0.526	0.857	0.449-1.636	0.639	1.286	0.586-2.823	0.529
Richest	0.800	0.482-2.326	0.886	0.609	0.311-1.194	0.148	1.239	0.562-2.733	0.595

4.3 Membership in an MHO and Out-of-pocket Expenditures

Table 4 presents results related to out-of-pocket expenditures on health and for delivery care. As expected, active household MHO membership was a significant determinant of lower out-of-pocket payments for health as a share of total household expenditures while SES is a predictor of higher expenditures. Active membership refers to households that paid a premium in the six months prior to the survey. For deliveries, MHO beneficiary status of the woman was a significant negative predictor of higher out-of-pocket expenses whereas distance from facility (6-10 km) was a positive predictor.

Removing financial barriers for maternal care requires that a woman of reproductive age (who could become pregnant at any time) be a beneficiary in a member household. Table 5 presents predictors of enrollment status among all women 15-49 years old who live in an area with an MHO (thus, of a subsample, 798 women from Bla survey population). Results indicate that women reporting poorer health; women with some education; women living in households where the head has some education, is older than 50, and works in the commercial or salaried sector; women in female-headed households; non-Bambara women; women employed occasionally; and women living closer to a health facility are more likely to enroll in an MHO. Importantly, SES does impact on decisions to enroll women (odds ratio 2.33).

4.4 Changes in Knowledge of Maternal Health Issues

IEC interventions seek to remove knowledge barriers. Table 6 presents IEC interventions and knowledge of key maternal health issues by women of reproductive age and by household heads. Knowledge remains generally mediocre for use of antenatal care, but improvements were seen overall since the 2003 baseline study, both for men and women. Danger signs showed the most improvement and are probably a "newer message." Among both men and women, those having heard a message were significantly more likely to have better knowledge.

These results are confirmed by multivariate analyses looking at predictors of knowledge for these key messages (shown in Table 7). Exposure to a radio message or exposure to a message through intensive media was a significant predictor of knowledge (except intensive media for early antenatal care). Another significant determinant of women's knowledge was the head of the household's knowledge of the message (with the exception of four or more antenatal visits), indicating that IEC interventions appear to be effectively targeting both men and women. Other predictors were proximity to a health facility (except for early antenatal care) and, in some cases, the educational level of the woman and household head (for early antenatal care and danger signs in pregnancy). Neither ethnic group nor SES had an effect on knowledge.

Table 4: Out-of-pocket for Household Total Health Expenditures and for Women Delivering in Modern Facility in Last 12 Months

	Household total health expenditures as percentage of total household expenditures for households with women aged 15-49 (n=1,057)				Out-of-pocket payment for delivery* (n=92)			
Household, Head of Household, and Women Characteristics	**Coefficient**	**Confidence Interval**	**Standard Error**	**P-value**	**Coefficient**	**Confidence Interval**	**Standard Error**	**P-value**
Active in MHO**	-0.417	-0.714- -0.120	0.151	0.006	-1.046	-1.821- -0.271	0.393	0.008
Access health facility (R=<=1 km)								
2-5 kms	-0.145	-0.464-0.174	0.162	0.373	-0.223	-0.538-0.493	0.261	0.931
6-10 kms	-0.122	-0.429-0.186	0.157	0.438	0.603	0.017-1.189	0.297	0.044
11+ kms	0.178	-0.267-0.623	0.226	0.432	0.263	-0.585-0.638	0.310	0.932
HH size	-0.005	-0.040-0.029	0.018	0.772	N/A	N/A	N/A	N/A
Woman's educ. level (R = no educ.)								
Primary or higher	N/A	N/A	N/A	N/A	0.025	-0.563-0.614	0.298	0.932
HH head's educ. level (R= no educ).								
Primary or higher	0.104	-0.137-0.345	0.123	0.397	0.486	-0.101-1.072	0.297	0.104
Sex of HH head (R=male)								
Female	-0.179	-0.778-0.419	0.305	0.557	0.197	-0.590-0.984	0.399	0.622
Woman participates in health care decisions (R=no)								
Woman participates	N/A	N/A	N/A	N/A	0.485	-0.275-1.245	0.385	0.209
Ethnic group HH (R = Bambara)								
Senofo	-0.126	-0.458-0.205	0.169	0.455	-0.193	-0.901-0.594	0.399	0.629
Other	-0.037	-0.315-0.241	0.141	0.793	-0.235	-0.833-0.363	0.303	0.439
HH wealth (R=poor)								
Middle	0.858	0.581-1.136	0.141	0.000	-0.009	-0.507-0.488	0.252	0.970
Richest	1.398	1.090-1.706	0.157	0.000	-0.345	-0.689-0.620	0.332	0.917

Occupation HH head (R = no job)								
Farmer/fisherman	-0.79	-1.075-0.927	0.508	0.876	0.162	-1.901-2.225	1.046	0.877
Commerce/admin	-0.002	-1.057-1.053	0.538	0.997	0.464	-2.041-2.969	1.270	0.715
Other job	0.260	-1.464-1.985	0.879	0.767	0.711	-1.429-2.851	1.085	0.513
Type job HH head (R= no job)								
Permanent job	-0.113	-1.135-0.910	0.521	0.829	0.452	-0.990-1.893	0.731	0.537
Non-permanent job	0.150	-0.855-1.156	0.513	0.769	0.428	-0.834-1.689	0.640	0.505
Woman's occupation (R = no job)								
Farmer/fisherman	N/A	N/A	N/A	N/A	0.289	-1.029-1.607	0.668	0.666
Commerce/admin	N/A	N/A	N/A	N/A	-0.421	-2.185-1.342	0.894	0.638
Other job	N/A	N/A	N/A	N/A	0.154	-1.292-1.599	0.733	0.834
Type job woman (R = no job)								
Permanent job	N/A	N/A	N/A	N/A	0.810	-0.324-1.943	0.575	0.161
Non-permanent job	N/A	N/A	N/A	N/A	-0.140	-1.413-1.133	0.645	0.828
Constant	1.473	0.971-1.975	0.256	--	7.165	5.680-8.649	0.753	--

* Women who had had cesarean section were excluded from this analysis.

** For households, active membership is having paid the MHO premium at least once in the six months prior to the survey; for women who delivered in the past 12 months, active membership is if the woman is a beneficiary of the MHO and her household paid a premium in the month of her delivery.

Table 5: Predictors of Active MHO Enrollment for Women Age 15-49 Living Where an MHO Exists

(N=798)	Women age 15-49 (n=741)		
Household, Head of Household, and Women Characteristics	**Odds ratio**	**Confidence interval**	**P-value**
Access health facility (R=<=1 km)			
2-5 kms	0.530	0.226-1.244	0.145
6-10 kms	0.201	0.078-0.516	0.001
11+ kms	0.819	0.197-3.405	0.783
Woman self-report good health	1.431	0.759-2.697	0.267
Woman self-report poor to avg health	2.195	1.111-4.330	0.023
HH size	1.026	0.952-1.105	0.501
Age of woman (R=20-34)			
<=19	0.691	0.373-1.280	0.239
35+	1.289	0.721-2.304	0.392
Age of HH head (R= <50)			
50+	1.977	1.198-3.262	0.008
Woman's educ. level (R = no educ.)			
Primary or higher	3.663	2.179-6.159	0.000
HH head's educ. level (R= no educ).			
Primary or higher	2.387	1.423-4.002	0.001
Sex of HH head (R=male)			
Female	2.717	1.221-6.048	0.014
Ethnic group HH (R = Bambara)			
Senofo	2.631	1.404-4.928	0.003
Other	2.170	1.169-4.029	0.014
HH wealth (R= poor)			
Middle	1.233	0.578-2.632	0.587
Richest	2.329	1.100-4.934	0.027
Occupation HH head (R = no job)			
Farmer/fisherman	3.445	0.566-20.95	0.179
Commerce/admin	14.377	2.477-83.45	0.003
Other job	5.246	0.351-78.31	0.229
Type job HH head (R= no job)			
Permanent job	0.281	0.052-1.515	0.140
Non-permanent job	0.219	0.039-1.239	0.086
Woman's occupation (R = no job)			
Farmer/fisherman	0.788	0.306-2.033	0.622
Commerce/admin	0.882	0.316-2.466	0.811
Other job	0.158	0.041-0.612	0.008
Type job woman (R = no job)			
Permanent job	1.462	0.570-3.748	0.429
Non-permanent job	3.102	1.279-7.522	0.012

Table 6: Comparison of Key Maternal Health Knowledge between 2003 and 2004

	Know first antenatal visit <4th month	Know 4+ antenatal visits	Mentioned all 4 pregnancy danger signs	Know vaginal bleeding as danger sign postpartum
Women age 15-49				
2003 survey (N=428)	42%	**46%**	**69%**	31%
Final 2004 survey (N=1,617)	46%	**52%**	**76%**	31%
(2004)				
Heard >1 intensive message (n=742)	47%	**59%**	**84%**	**38%**
Heard no intensive message (n=828)	46%	**47%**	**70%**	**26%**
(2004)				
Heard >1 radio message (n=873)	**50%**	**58%**	**84%**	**36%**
Heard no radio message (n=697)	**43%**	**45%**	**66%**	**25%**
Men: household head				
2003 survey (N=321)	44%	**52%**	74%	**29%**
Final 2004 survey(N=1,453)	46%	**76%**	73%	**38%**
(2004)				
Heard >1 intensive message (n=659)	48%	79%	**77%**	**40%**
Heard no intensive message (n=794)	46%	75%	**70%**	**36%**
(2004)				
Heard >1 radio message (n=774)	46%	75%	**78%**	39%
Heard no radio message (n=643)	48%	78%	**67%**	36%

N.B. percentages in bold are significant at the p< 0.05

Table 7: Predictors of Knowledge of Maternal Health Issues in Women Age 15-49

N= 1,617	Know first antenatal visit <4th month (n=1,366)			Know 4+ antenatal visits during pregnancy (n=1,366)			Mentioned all 4 pregnancy danger signs (n=1,366)			Know vaginal bleeding as a danger sign postpartum (n=1,366)		
Household, Head of Household, and Women Characteristics	**Odds ratio**	**Confidence interval**	**P-value**	**Odds ratio**	**Confidence interval**	**P-value**	**Odds ratio**	**Confidence interval**	**P-value**	**Odds ratio**	**Confidence interval**	**P-value**
Household head heard message	2.263	1.718-2.981	0.000	1.146	0.832-1.579	0.404	1.814	1.300-2.533	0.000	3.270	2.414-4.436	0.000
Heard message through intensive media*	0.889	0.664-1.192	0.432	1.383	1.039-1.841	0.026	1.511	1.061-2.151	0.022	1.504	1.095-2.065	0.012
Heard message through radio	1.348	1.010-1.798	0.043	1.557	1.175-2.063	0.002	2.486	1.775-3.481	0.000	1.574	1.144-2.165	0.005
Access to health facility (R= <=1 km)												
2-5 kms	0.729	0.497-1.068	0.105	0.678	0.465-0.988	0.043	0.407	0.260-0.639	0.000	0.690	0.450-1.058	0.089
6-10 kms	0.794	0.565-1.117	0.185	0.913	0.651-1.281	0.598	0.478	0.314-0.728	0.001	0.941	0.647-1.368	0.750
11+ kms	0.933	0.593-1.469	0.765	1.022	0.646-1.618	0.925	0.988	0.528-1.846	0.969	0.604	0.354-1.031	0.065
Education of woman (R = no education)												
Primary or higher	1.495	1.068-2.092	0.019	0.929	0.669-1.289	0.659	0.842	0.564-1.257	0.400	0.984	0.669-1.448	0.936
Education of HH head (R = no education)												
Primary or higher	0.670	0.504-0.890	0.006	0.957	0.724-1.264	0.756	0.625	0.446-0.877	0.007	0.799	0.585-1.092	0.159
Ethnic group (R = Bambara)												
Senofo	0.760	0.471-1.224	0.258	0.944	0.599-1.488	0.805	0.902	0.513-1.583	0.718	0.811	0.484-1.359	0.427
Other	1.001	0.736-1.360	0.997	0.933	0.690-1.263	0.655	0.834	0.579-1.200	0.327	1.084	0.770-1.527	0.643
HH wealth (R = poor)												
Middle	1.047	0.759-1.444	0.780	1.050	0.766-1.439	0.764	0.944	0.646-1.379	0.765	0.904	0.631-1.294	0.580
Richest	0.990	0.691-1.419	0.957	0.851	0.596-1.214	0.373	1.215	0.787-1.876	0.379	0.970	0.661-1.425	0.878

* Intensive media includes theater/sketch, home visit, group health education

5. Discussion

Research results indicate that the two demand-side interventions studied, MHOs and IEC intervention, have the potential to impact utilization of maternal health services. Having heard an IEC message was a positive predictor of a woman's use of early antenatal care and delivery in modern facilities. MHOs appear to impact use of early antenatal care. The small sample size may mask other impacts of MHOs and the potential interaction between MHOs and IEC campaigns. Importantly, it appears that distance is a significant factor across the board for all three interventions studied (early antenatal care, four or more antenatal visits, and delivery in a modern facility).

5.1 IEC Campaigns

IEC campaigns appeared to effectively remove knowledge barriers. Women and men who heard at least one message (intensive or radio) in the last year were more likely to have knowledge about most maternal health issues. Having heard a message was a significant predictor of knowledge of all messages, and was also a predictor of utilization of early antenatal care and delivery in a modern health care facility. The fact that men had higher levels of knowledge about the number of antenatal visits is encouraging, since in about three-quarters of the households, the man was the decision maker for the woman's use of health care services. However, even with these favorable findings concerning IEC, use of early and routine antenatal visits still remains at about 30 percent overall, despite higher levels of knowledge.

5.2 Mutual Health Organizations

MHOs do appear to alleviate financial barriers by reducing household expenditures on health, as well as expenditures at the time of services for deliveries, and data on reasons for non-use from the 2004 final survey indicate that lack of money is a barrier to use of antenatal care (57 percent) and for delivery in a modern facility (25 percent). Limited by a small sample size, this study was only able to demonstrate an impact of MHO beneficiary status on antenatal care; further research would be needed to confirm whether MHOs contribute to higher utilization of deliveries at a modern facility, as hypothesized.

It is worth noting that MHOs in Bla District had encountered significant difficulties with enrollment in 2002 and 2003. A poor cotton harvest and other cotton market disruptions impacted households' income and, thus, their ability to join and pay premiums. Although these two MHOs did some outreach to potential members in the outlying villages and hamlets, 67 percent of respondents cited lack of information as a reason for not joining. Further, MHO offices were located in the town or major village and neither MHO had any decentralized offices, raising issues regarding the population's physical access to the MHOs. Hence, these two MHOs remained fairly small, affecting the study's ability to include larger numbers, which would have facilitated full impact assessment in this analysis. During 2004, when the economic situation improved, MHOs were able to increase membership.

Women's enrollment was also affected by whether the woman herself was better educated or the head of the household was female. Members were more likely to be from minority ethnic groups, which are perhaps less traditional in their attitudes and more "open" to innovation than the majority of the Bambara population who still live in their original communities and adhere more strongly to traditional ways. In the Bambara community, women rarely have decision-making power or financial independence to join an MHO without authorization from the head of the household.

The analysis also shows SES has a significant impact on enrollment, raising concerns that MHO premiums may present a barrier for the poorest households to enroll in the risk-pooling schemes. Responses from non-members living in the MHO catchment areas in Bla District indicate that for 18 percent of respondents, lack of means is a reason for not joining. That said, it should be noted that all households in Bla are poor, annual per capita consumption in the richest tercile is $194, and these households are purchasing memberships, demonstrating that MHOs are an effective means to reach at least some of the poor.

In developing countries where health insurance coverage tends to be limited to urban, formal sector employees, MHOs are viewed as a promising insurance mechanism for reaching households in the rural and informal sector. Growing evidence of MHOs' potential led the World Health Organization's Commission on Macroeconomics and Health and the World Bank, in 2001, to endorse mutual health insurance (or community-based health insurance) as an alternative health-financing option (Sachs et al, 2001). Enthusiasm for MHOs has also grown among governments and communities in developing countries, which, combined with external support for the development of MHOs, has resulted in a proliferation of schemes, particularly in Sub-Saharan Africa (La concertation, 2006). The number of schemes in this region has grown from less than a handful in the 1980s to hundreds today. In addition, MHOs have been incorporated into national health financing strategies in several countries, including Tanzania, Ghana, Mali, Rwanda, Senegal, Uganda, and Benin.

5.3 Future Directions

Further study is needed to better understand how to effectively increase MHO membership. Bringing this impact of MHOs to scale will require broader government support for a mutual health insurance strategy. The lessons learned from these MHOs in Bla demonstrate that areas for further strengthening include recruiting members, increasing access to the MHO through decentralized offices, implementing mechanisms to smooth out the effects of fluctuations in the cash economy that hamper households' ability to pay premiums, and subsidizing memberships for those who cannot afford to pay. Solutions explored in some districts in Rwanda included creating a "tontine" system whereby participating households could make installments until they had accumulated the full enrollment fee, at which point they would join the MHO; in another district, a local church subsidized enrollment for orphans and widows (Schneider and Diop, 2001). The government, MHO promoters, and MHOs themselves should also explore the possibility of creating greater links between the MHOs' mandate in financing health care with a broader role of advocacy and education of their members on health issues including maternal health.

These two interventions address the demand-side issues affecting decisions to use care. Significant supply-side issues concerning adequate quality of care provided, which in turn affects the ability of care to reduce risks of maternal mortality, still remain. In the 2004 survey, 38 percent of those not delivering in a modern facility cited distance or transportation problems, and 19 percent said they did not have time to travel to a facility ("labor came too quickly," also reflecting a distance issue). In fact, significant advancement towards the Millennium Development Goals related to

maternal health can only be achieved when both the supply and demand issues are resolved. Furthermore, although these two interventions did show an impact on maternal health utilization, access to maternal health services, particularly for deliveries, remains a major issue in rural Mali, and this will require more creative solutions if deliveries with a skilled birth attendant is to be achieved.

Annex A: Stages of IEC Implementation

In the period before 2003, there was no coordinated information, education, and communication (IEC) program to strengthen the knowledge and utilization of maternal health services, and little IEC existed concerning assisted deliveries. The PHR*plus* project supported the implementation of an IEC campaign based on two main pillars:

- A radio campaign on maternal health topics on the local Bla radio station. This station reaches most of the population of Bla District (Malian Ministry of Health's standard approach to IEC).

- An intensive community-based IEC package, including group health education sessions by community mobilizers, sketches (local theatre) performed by local companies, orientation for pregnant women conducted by retrained traditional birth attendants, and home visits. The intensive package was implemented in a zone where no MHO existed (Yangasso) and in a zone which had an MHO (rural areas surrounding Blaville).

A local nongovernmental organization (NGO) contracted to support monitoring and documentation of activities by health and social development workers in Bla District provided technical support.

These activities targeted not only women of childbearing age, but also heads of households and other decision makers. Table A-1 summarizes the essential content of each stage of the "IEC" intervention. The following were the key implementation steps to the IEC campaign:

Develop appropriate messages: A technical working group was established to prepare messages, based on those used by the Ministry of Health. These messages were then tested and fine-tuned through a series of focus group discussions (in non-intervention areas) with male heads of household, women of childbearing age, and youth and elderly. These messages were then finalized with key stakeholders.

Organize and prepare implementation: Information about the IEC intervention was communicated to health workers at the Community Health Centers (Bla Centrale and Yangasso) and village chiefs in 37 villages. Health center staff and NGO staff trained 77 community mobilizers in promotion techniques and new IEC messages and tools.

Implement IEC intervention: Beginning in June 2003 and throughout the project, radio broadcasts aired three times a day. From November 2003 to April 2005, heath education sessions and home visits were conducted by community mobilization agents, community organizers, and health center staff; and sketches (short plays) were performed in each of the 37 target villages (11 in rural Bla and 26 in Yangasso).

Table A-1. IEC Implementation

Stage of Intervention	Principal Activities/Findings	Timeline/Period
Develop maternal health IEC messages	Form technical group workshop to prepare messages (based on national maternal health messages). Organize and hold three focus group discussions (male heads of household and women of childbearing age, youth and the elderly) to test and fine-tune the proposed messages (in the zones not involved in the study). Hold a stakeholders workshop to finalize the messages. Themes of the messages prepared: ▲ Antenatal care timeline ▲ Danger signs in pregnancies ▲ Importance of antenatal care ▲ Importance of tetanus vaccinations among women of childbearing age and pregnant women ▲ Pregnancy and malaria ▲ Importance of maintaining antenatal care and vaccination booklets ▲ Importance of assisted delivery and management of complications during delivery ▲ Signs of labor ▲ Benefits of postnatal care	March 2003 March 2003 April 2003
Contact made with CSCom health personnel in Bla central and Yangasso Visits to 37 villages: 11 in Bla rural and 26 in Yangasso	Data collection, explanation of the IEC maternal health program. The medical officer and *matrone* in each CSCom were used to train the community mobilization agents and to conduct monitoring to improve IEC techniques in the villages. Information sessions for village chiefs, in which community mobilization agents also participated, to explain the IEC program in advance and to schedule times for training in the two selected zones	Early November 2003, 2 days 9 days
Provide additional training to community mobilization agents	Themes: assisted delivery, antenatal and postnatal care. Training in promotion techniques (health education sessions and home visits with 77 coordinators trained)	Mid-November 2003, 3 days per zone

Organize and broadcast a radio campaign	Broadcast messages on the local rural radio station in Blaville intended for the relevant zones (weak radio signals in the control zone of Falo)	Starting in June 2003 and ongoing throughout the project
Conduct health education sessions, home visits, and sketches	Done by the community mobilization agents, community organizers, and CSCom personnel	November 2003 to April 2004

Annex B: Description and Comparison of the Three Household Surveys

The research design used includes a before-after and control group design to test the impact of MHOs and IEC on utilization of high-impact services and, specifically, fever treatment and assisted deliveries. Two baseline household surveys were conducted, the Equity Initiative household survey in 1999 and the IEC baseline household survey in 2003. In 2004, a follow-up household survey was conducted. Table B-1 presents the types of data collected and zones sampled. As seen in Table B-1, some content areas were not comparable between the baselines and final surveys but because of the control areas in the 2004 evaluation survey, conclusions can be drawn on the impact of MHOs and IEC on utilization of priority health services.

Table B-1: Comparison of Content of Various Houshold Surveys

Types of Data	Equity Initiative Baseline 1999	IEC Baseline 2003	Evaluation 2004
Demographic	Yes	Yes	Yes
Socioeconomic	Consumption	limited asset index	Consumption; asset index
Utilization fever	Yes		Yes
Utilization-assisted deliveries	Yes	Yes	Yes
Utilization prenatal care	Yes	Yes	Yes
Utilization postnatal care	Yes	Yes	Yes
Child health interventions			Yes
Insecticide-treated mosquito nets			Yes
Knowledge of maternal health		Yes	Yes
MHO experience			Yes

Table B-2 shows the geographic areas covered, including intervention and control zones, in the three household surveys.

Table B-2: Geographic Coverage of the Various Household Surveys

Surveys	Bla District	Sikasso Commune
Situation analysis 1999*	50 census sections randomly selected	30 census sections randomly selected
IEC baseline survey 2003	MHO area: Blaville, Kemeni Intensive IEC/MHO: Bla rural Intensive IEC only: Yangasso Control: Falo	----

Evaluation survey 2004	MHO members: Blaville, Kemeni IEC: Yangasso MHO area non-members: Bla urban, Bla rural, Kemeni Control: Bla Central, Falo, Fani, Naimana	MHO members: Wayerma, Bougoulaville MHO area non-members: Wayerma, Bougoulaville Control: surrounding areas

* Because the Equity Initiative situation analysis/baseline was conducted before specific intervention sites were selected, there is no "control area" in this baseline.

Annex C: References

Arhin-Tenkorang, D. 2001. Health insurance for the informal sector in Africa: Design features, risk protection, and resource mobilization. HNP Discussion Paper. Washington, D.C.: World Bank.

Becker S., D.H. Peters, R.H. Gray, C. Gultiano, and R.E. Black. 1993. The determinants of use of maternal and child health services in Metro Cebu, the Philippines. *Health Transition Review* 3:77-89.

Bennett S., A. Gamble Kelley, and B. Silvers. 2004. 21 questions on CBHF: An overview of community-based health financing. Bethesda, MD: Abt Associates Inc.

Bhatia, J.C., and J. Cleland. 1995. Determinants of maternal care in a region of South India. *Health Transition Review* 5:127-142.

Celik Y., and D.R. Hotchkiss. 2000. The socio-economic determinants of maternal health care utilization in Turkey. SSM 2000; 50:1797-1806.

Clemmons L., and Y. Coulibaly. 1999. Cultural resources and maternal health in Mali. *IK Notes* 12:1-4

Clift, E. 2001. Information, education, and communication: Lessons from the past, perspectives for the future. WHO Occasional Paper, 6: WHO/RHR/01.22.

Deaton, A., and S. Zaidi. 2002. Guidelines for constructing consumption aggregates for welfare analysis. Living Standards Measurement Study Working Paper No. 135. Washington, D.C.: The World Bank.

Ekman, B. 2004. Community-based health insurance in low-income countries: A systematic review of the evidence. *Health Policy and Planning*, 19: 249-270.

Franco, L.M., C.H.T. Simpara, A. Gamble Kelley, F.P. Dop, M. Makinen, A. Ba, and C.R. Burgert. 2006. Evaluation of the impact of mutual health organizations on utilization of high impact services in Bla and Sikasso districts in Mali. Technical Report. Bethesda, MD: Partners for Health Reform*plus* Project, Abt Associates Inc.

Freedman, L.P., R.J. Waldman, H. de Pinho, M.E. Wirth, A.M.R. Chowdhury, and A. Rosenfield. 2005. Transforming health systems to improve the lives of women and children. Lancet, 365: 997-1000.

Gamble Kelley, A., E. Kelley, C.K. Simpara, O. Sidibe, and M. Makinen. 2001. Reducing barriers to the use of basic health services: Findings on demand, supply, and quality of care in Sikasso and Bla. Bethesda, MD: Partnerships for Health Reform, Abt Associates, Inc.

Glei, D.A., N. Goldman, and G. Rodriguez. 2002. Utilization of care during pregnancy in rural Guatemala: Does obstetrical need matter. Office of Population Research, Princeton University, Working Paper Series, Working Paper 2002-01.

Goldman, N., and A.R. Pebley. 1994. Childhood immunization and pregnancy related services in Guatemala. *Health Transition Review*, 4:29-43.

Khan, K.S., D. Wojdyla, L. Say, M. Gulmesoglu, and P.F. Van Look. 2006. WHO analysis of causes of maternal death: A systematic review. *Lancet*, 367: 1066-74.

Koblinsky, M.A., and O.Campbell. 2003. Factors affecting the reduction of maternal mortality. In *Reducing maternal mortality: Learning from Bolivia, China, Egypt, Honduras, Indonesia, Jamaica and Zimbabwe*. Washington, DC: The World Bank.

La concertation sur les mutuelles de santé (ed.). Inventaire des systèmes d'assurance maladie en Afrique. Country reports available at http://www.concertation.org (accessed April 18, 2006).

Lule, E., G.N.V. Ramana, N. Ooman, J. Epp, D. Huntington, and J.E. Rosen. 2005. Achieving the millennium development goal of improving maternal health: Determinants, interventions and challenges. HNP Discussion Paper. Washington, D.C.: The World Bank.

Magadi, M.A., N.J. Madise, and R.N. Rodrigues. 2000. Frequency and timing of antenatal care in Kenya: Explaining the variations between women of different communities. SSM, 51:551-561.

Manandhar, D.S., D. Osrin, B.P. Shrestha, N. Mesko, J. Morrison, K.M. Tumbahangphe, et al. 2004. Effect of a participatory intervention with women's groups on birth outcomes in Nepal: Cluster-randomized controlled trial. *Lancet,* 364:970-79.

Nanda, P. 2002. Gender dimensions of user fees: Implications for women's utilization of health care. *Reproductive Health Matters,* 10:127-134.

Nanda, G., K. Switlick, and E. Lule. 2005. Accelerating progress towards achieving the MDGs to improve maternal health: A collection of promising approaches. HNP Discussion Paper. Washington, D.C.: The World Bank.

Planning and Statistics Unit of the Ministry of Health, National Directorate of Statistics and Computer Science, ORC Macro. Mali demographic and health survey 2001. Calverton, MD: CPS/MS, DNSI and ORC Macro, 2001.

Sachs, J.D., et al. 2001. Macroeconomics and health: Investing in health for economic development. Report of the Commission on Macroeconomics and Health. Geneva: World Health Organization.

Schneider, P., and F. Diop. October 2001. Impact of prepayment pilot on health care utilization and financing in Rwanda: Findings from final household survey. Bethesda, MD: Partners for Health Reform*plus* Project, Abt Associates Inc.

Schneider, P., F. Diop, D. Maceira, and D. Butera. 2001. Utilization, cost, and financing of district health services in Rwanda. Technical Report No. 61. Bethesda, MD: Partnerships for Health Reform, Abt Associates Inc.

Schneider, P., and K. Hanson. 2006. Horizontal equity in utilization of care and fairness of health financing: A comparison of micro-health insurance and user fees in Rwanda. *Health Economics,* 15:19-31.

Smith, K., T. Dmytraczenko, B. Mensah, and O. Sidibe. 2004. Knowledge, attitudes and practice related to maternal health in Bla, Mali: Results of a baseline survey. Bethesda, MD: Partners for Health Reform*plus*, Abt Associates.

Stekelenburg, J., S. Kyanamina, M Mukelabai, I. Wolffers, and J. van Rossmalen. 2004. Waiting too long: Low use of maternal health services in Kalabo, Zambia. *Tropical Medicine and International Health*, 9: 390-398.

Tabor, S.R. 2005. Community-based health insurance and social protection policy. Social Protection Discussion Paper Series. Washington, D.C.: World Bank.

Tsui, A., J.N. Wasserheit, and J. Haaga (eds.). 1997. Reproductive health in developing countries: Expanding dimensions, building solutions. Washington, D.C.: National Academy Press.

United Nations. 2005. The millennium development goals report. New York: United Nations.

WHO, UNICEF, and UNFPA. 2003. Maternal mortality in 2000: Estimates developed by WHO and UNICEF. Geneva: World Health Organization.