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Effects of mutual health organizations on use of priority health-care services in urban and rural Mali: a case-control study

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   Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. المقالة لهذه الكامل النص نهاية في الخلاصة لهذه العربية الترجمة.

Objective To examine the effects of a community-based mutual health organization (MHO) on utilization of priority health services, financial protection of its members and inclusion of the poor and other target groups.

Methods Four MHOs were established in two districts in Mali. A case-control study was carried out in which household survey data were collected from 817 MHO member households, 787 non-member households in MHO catchment areas, and 676 control households in areas without MHOs. We compiled MHO register data by household for a 22-month period. Outcome measures included utilization of priority services, health expenditures and out-of-pocket payments. Independent variables included individual, household and community demographic, socioeconomic and access characteristics, as determined through a household survey in 2004.

Findings MHO members who were up to date on premium payments (controlling for education, distance to the nearest health facility and other factors) were 1.7 times more likely to get treated for fevers in modern facilities; three times more likely to take children with diarrhoea to a health facility and/or treat them with oral rehydration salts at home; twice as likely to make four or more prenatal visits; and twice as likely, if pregnant or younger than 5 years, to sleep under an insecticide-treated net ($P < 0.10$ or better in all cases). However, distance was also a significant negative predictor for the utilization of many services, particularly assisted deliveries. Household and individual enrolment in an MHO were not significantly associated with socioeconomic status (with the exception of the highest quintile), and MHOs seemed to provide some financial protection for their members.

Conclusion MHOs are one mechanism that countries strengthening the supply of primary care can use to increase financial access to – and equity in – priority health services.

Introduction

In most African countries, including the low-income, landlocked Sahelian nation of Mali, poor and rural populations have low utilization and coverage rates for key preventive and primary curative interventions. Because of their poverty, these populations tend to suffer more health problems; because of their health problems, they tend to be poorer.[1] There are many reasons for low utilization of priority health services in Africa, including poor physical and financial access to care, socioeconomic factors, cultural factors and perceptions about the quality of care.[2–9]

In western Africa, mutual health organizations (MHO) have sprung up with amazing speed.[10,11] MHOs are voluntary organizations that provide health insurance services to their members and they are usually owned, designed and managed by the communities they serve. Member households pay an enrolment fee and then regular premiums to cover a membership-defined benefits package. After a waiting period, the MHOs reimburse providers of care for the services used by beneficiaries in the member households, with users making a small co-payment. MHOs are not for profit and are based on ethical principles of mutual aid and social solidarity.[10] The rise in popularity of MHOs reflects a need in communities to address the difficulty of paying for health care when care is required. The government of Mali recognized the potential of MHOs in its 1997 ten-year health and social sector development plan.[12]

Promoted as a solution to many health system problems, MHOs can provide additional avenues of resource mobilization and financial protection against devastating health-care expenditures, increase financial access to care, promote equity through risk-pooling as well as strengthen community solidarity and demand for quality care.[13–15] At a minimum, MHOs should contribute to increased use of effective and needed health services[16] and serve as a proxy for improved health.

Although there is enthusiasm and consensus on the worthiness of the principles and concepts behind the MHO movement,[17] concerns exist about their ability to meet all expectations. There is still little robust evidence of MHO cost-effectiveness, of their ability to cover significant portions of the population, or of the sustainability or effectiveness in increasing access to care and financial protection.

Recent broad reviews of the MHO literature[16,18] found few studies that measure the effects of MHOs on health care utilization and even fewer that used econometric regression analysis.[18]

What *is* known from the few studies that have rigorously investigated the effects of MHOs is that: (i) there is an ever-growing demand for such financial protection mechanisms; (ii) MHOs seem able to enrol individuals from a variety of socioeconomic strata, although perhaps not the very poor;[19–21] (iii) members tend to have lower out-of-pocket expenditures than do non-members;[19,20,22] and (iv) members tend to use health services more when needed than do people not enrolled in MHOs.[19,23,24] The literature also highlights that MHOs require technical support to attain functionality, that they still tend to be small, and that they will be only one of many mechanisms for financing the health sector.[13,16,17,]

In this paper we examine the effects of a community-based MHO intervention on the use of curative, maternal and child health inventions; inclusiveness of MHO membership, and MHOs' ability to provide financial protection in a rural and urban setting in Mali.

Methods

Setting

Four MHOs were developed by the Ministry of Health of Mali and the USAID-funded Partnership for Health Reform project[25] as part of a pilot programme to improve financial access to health services. A steering committee chaired by the Mali Ministry of Health selected four MHO pilot sites for the study: two in the rural district of Bla (BlaVille and Kemeni) and two in the urban commune of Sikasso (Wayerma and Bougoula). These sites were selected for their representativeness of the socioeconomic conditions faced by a large portion of Mali's population.

The USAID-funded Partners for Health Reform and Partners for Health Reform*plus* projects provided funding and technical assistance for MHO development and evaluation design. To ensure the sustainability of the organizations, no direct financial support was provided for the ongoing operation of the MHOs. At the start of the MHO intervention, a baseline household survey revealed low levels of coverage for antenatal care (57%); assisted deliveries (26%); child immunizations (29%); and treatment of child diarrhoea with oral rehydration therapy (30%). Utilization of

curative services ranged from 0.24–0.30 visits per person per year.[26,27] In Bla district, roads are few and there is no ambulance service.

MHO intervention and study design

Table 1 presents descriptive information for the four pilot MHOs. Member households paid a once-off enrolment fee and a monthly or annual premium (based on the number of beneficiaries). On joining, members committed to make use of preventive services, such as immunizations, prenatal care and insecticide-treated mosquito nets. The MHOs signed agreements with local primary health-care centres and referral health centres (where available). When members or their beneficiaries needed curative or maternal care and were up to date on their premium payments, they paid a portion of charges (usually 20–25%) at the time of service, and the MHO covered the larger remaining portion.

Using a case-control design, we sought to answer three major research questions:

1. Does MHO membership affect utilization of priority health services such as modern treatment for fever and diarrhoea (in children), prenatal care and assisted deliveries, childhood immunizations, vitamin A supplementation, and use of insecticide-treated mosquito nets?

2. Are MHOs inclusive in their enrolment of members? That is, do the schemes capture the poor, women of reproductive age and children under 5 years of age?

3. Does MHO membership provide financial protection against health expenditure?

The intervention (case) group consisted of households joining one of the four MHOs. Controls fell into two categories: those who were living in areas where there was a functioning MHO but who did not join, and those who lived in areas where there was no MHO.

To evaluate the impact of the MHO intervention, we collected data from two sources: a household survey conducted in September and October 2004 and a review of MHO registers. The household survey collected household and individual data through interviews with the head of the household on socioeconomic variables, self-reported distance to the nearest health facility, utilization of priority health services, reasons for non-utilization and MHO membership.[25] Questionnaires were pilot tested in an area outside the study sites. MHO registers provided data on membership,

premium payment and services covered from January 2003 (when the MHOs became operational) to October 2004. Both sources used the same set of unique household identifiers, allowing the data sets to be linked.

Household survey sampling was conducted separately for members and non-members. All MHO member households in BlaVille, Kemeni and Bougoula study sites were included in the sample. However, because the MHO in Wayerma was much larger than those at the other three sites, we randomly selected 350 households from this site to allow statistically any existing significant differences to be detected among three groups: (i) members joining before April 2004, (ii) members joining after April 2004 and paying premiums for September 2004, and (iii) members joining after April 2004 but not up to date on premium payments. MHO registers provided a full list of member households.

Sampling of non-member households was based on a random selection of enumeration areas (census-defined population clusters), an updated mapping of all households in the selected enumeration areas, and systematic selection of individual households based on a random number.

Because rural Mali's economy is largely non-cash and most household production is consumed, household wealth was measured by an approximation of consumption.[28] Information on consumption was systematically collected from each household and included data on food (purchased and self-grown), transportation, lodging, utilities (water, electricity, combustibles, etc.), school fees, health, and clothing. All estimations were annualized and summarized for the household, and then converted to an adjusted overall per capita figure by dividing the total value of household consumption by the number of members of the household, weighting adults (aged > 14 years) at a value of 1 and children (aged ≤ 14 years) at a value of 0.75. The mean per capita income for all sampled households was US dollars (US$) 358 (US$ 231 in rural Bla district and US$ 510 in urban Sikasso), well within the range of The World Bank's 2004 estimate of US$ 390. All consumption rates were converted into US dollars at the October 2004 rate of 527 CFA francs to 1 US$. Five equally-sized socioeconomic quintiles were developed, based on the adjusted per capita consumption figures: poor, middle poor, middle, middle rich and rich quintiles.

Households may pay the enrolment fee but later fail to make premium payments, causing their MHO coverage to lapse. Thus, additional groupings were used in the analyses: active household membership in an MHO – households having paid premiums at least once in the 6 months before the survey; and eligibility for MHO coverage – being registered as a beneficiary in an MHO household that paid premiums in the month(s) when services were used.

All survey instruments and confidentiality and data security protocols were reviewed by Abt Associates Inc.'s institutional review board and the Mali Study Steering Committee.

Statistical analyses

Data entry was conducted with use of MSACCESS data entry screens (Microsoft, Redmond, WA, United States of America). Data manipulation and analysis were performed with Intercooled STATA 8.0 (StataCorp. LP, College Station, TX, USA). 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 of a household being selected in that enumeration area. The base sampling weight for MHO households was 1.0 but was adjusted for non-response, and in Wayerma it was also adjusted for sampling.

Multivariate statistical analysis used STATA's survey logit regression function to ascertain whether being an MHO beneficiary was a predictor of higher rates of health service utilization using the following formula:

Model: $\ln[\text{Prob(individual used care)} / \text{Prob(individual did not use care)}] = \alpha 1 + \beta X$.

The formula for establishing MHO household and individual enrolment determinants was:

Model: $\ln[\text{Prob(being enrolled)} / \text{Prob(not being enrolled)}] = \alpha 1 + \beta X$

if living where there was an MHO.

We used a multivariate linear regression to examine whether MHO membership translated into lower out-of-pocket payments for health services, both at the household and the individual level, using the formula

Model: $\ln[Y + 1] = \alpha + \beta X$

Results

Table 1 shows MHO packages from the four study sites with a comparison of fees,

benefits, membership and coverage. Table 2 presents sample sizes for all groups and

for priority-health-service target populations and Table 3 summarizes the

characteristics of the households surveyed in the sample.

Utilization of priority health services

Table 4 (available at: http://www.who.int/bulletin/volumes/11/08-

051044/en/index.html) presents the results of logit regression on the utilization of

modern paying health services: fever treatment (all ages), diarrhoea treatment in

children younger than 5 years, prenatal care and delivery in a modern health facility.

The regressions control for individual, household and community characteristics.

Results (significant at the $P < 0.10$ or better) indicate that, compared with non-

members and lapsed members, up-to-date MHO members were 1.7 times more likely

to seek treatment for fever in a modern facility; three times more likely to seek

modern and/or oral rehydration therapy for diarrhoea in their children under 5 years;

and twice as likely to make at least four prenatal visits during pregnancy.

Among control variables, distance to the health facility was a significant

negative predictor for health-care seeking: those living more than 2 km away were

half as likely to seek fever treatment and two-thirds to four-fifths less likely to deliver

in a modern facility than were people who lived within 2 km of a health facility; those

living 6–10 km from a health facility were two-thirds less likely to complete at least

four prenatal visits. The diarrhoea treatment variable includes home treatment with

oral rehydration therapy, which may explain why distance here was not a significant

predictor. Household wealth quintiles did not show any consistent pattern of influence

on use of services.

Table 4 also shows the results of logit regression on utilization of preventive

services provided free of charge by health facilities (diphtheria-tetanus-pertussis 3

immunization before the first birthday among children aged 12–23 months; vitamin A

supplementation in children 6–59 months as reported on card or by caretaker if no

card available) and use of insecticide-treated mosquito nets (which are promoted but

not subsidized by the MHO) by children younger than 5 years and by pregnant

women. Although MHO membership did not appear to influence the use of child

vaccinations or vitamin A supplementation, it was a significant predictor of treated-mosquito-net use in both children and women during pregnancy. Having access to an MHO was a significant predictor for treated-mosquito-net use in pregnant women, but not in children. Again, household wealth quintiles showed no consistent association with the use of insecticide-treated mosquito nets.

Inclusion of the poor and key target populations

Table 5 (available at: http://www.who.int/bulletin/volumes/11/08-051045/en/index.html) presents the results of logit regression on overall household and individual enrolment in an MHO. While enrolment for all categories (household, individual, women 15–49 years and children under 5 years) was significantly higher in the rich household wealth quintile, enrolment rates did not differ between the poor, middle poor, middle or middle rich households. A key predictor of enrolment for all categories was distance to a health facility, except for children under 5 years. Household size had a significantly positive association with enrolment across all categories, as did education levels of the household head and female/caretaker. Households headed by a female were five times more likely to be enrolled in an MHO; four times more likely to enrol women of reproductive age; and eight times as likely to enrol children.

Ethnicity was also associated with enrolment: the majority ethnic group (Bambara) was significantly less likely to enrol across all categories. Finally, some adverse selection appears to be present: households with a household head who reported being in less than excellent health and households with chronically ill and/or handicapped individuals were more likely to enrol.

MHOs, financial protection and affordability

Table 6 (available at: http://www.who.int/bulletin/volumes/11/08-051045/en/index.html) presents the results of linear regressions on overall household health expenditures, annual household health-care expenditures as a percentage of total household cash consumption, and out-of-pocket expenditures for fever treatments. Being an active MHO member was associated with lower household health expenditures as a percentage of overall cash consumption and lower out-of-pocket payments for fever treatments. Positive predictors for all household health expenditure measures included a high education level for the household head and

higher household wealth quintiles. Health expenditure tended to be lower in urban areas than in rural ones; data from the study do not provide any explanation for this finding, but it may be due to competition and a wide choice of options in urban areas.

Table 7 presents two other financial protection measures for active MHO members and the overall population. The ratio of mean-to-median expenditures expresses a measure of financial risk: when the ratio is high, some households in the group are spending considerably higher amounts than others. Whether examining expenditures as an absolute value or relative to cash consumption, MHO members spend more, but have less financial risk, as their mean-to-median ratios are lower, especially in Bla district (BlaVille and Kemeni) with its largely rural population.

Table 8 presents estimates of annual household MHO expenditure, including premiums and co-payments for care, based on MHO register data. At US$ 29 to US$ 54 per household, estimated MHO spending is 1.7% to 3.0% of annual income at Mali's poverty line (US$ 295 per capita or US$ 1765 per household[29]). Examining these estimated household MHO expenses in light of cash income shows that even if MHO households enrolled *all* their members (which many currently do not), MHO-related spending would come to 2% to 8% of cash income, and this expanded MHO spending still falls between mean and median household cash expenditures on health as a percentage of total cash income (for the whole study population – MHO members and non-members).

Discussion

These four Malian MHOs sought to rearrange community financing provisions, building on community-based organizations to mitigate barriers associated with Bamako Initiative resource mobilization strategies. Further, they aimed to improve access to health-care services while protecting the income of the poor and strengthening their voice in the health sector. While confirming the effects of traditional determinants of health-care utilization (illness severity, education, income, and distance), our results support evidence that MHOs improve utilization, even for the poor, and help households to better manage their health-care expenditures. The results of this study corroborate findings from other MHO studies in Ghana,[30,31] India,[22] Rwanda,[20,23] Senegal[19,30,31] and Viet Nam.[21]

Our results show that MHOs have a positive effect on the utilization of many priority services. Up-to-date MHO members and beneficiaries, compared with controls, were 1.7 times more likely to have their fever treated in a modern health facility; three times more likely to use oral rehydration salts or seek modern care for their children under 5 years with diarrhoea; and twice as likely to make at least four prenatal visits during pregnancy. Sleeping under an insecticide-treated mosquito net was also twice as likely during pregnancy and in children under 5 years of age in the up-to-date group.

However, distance to health facilities remains a significant negative predictor of utilization of treatment for fever, prenatal services and assisted-delivery care, indicating that even 2 km can represent a geographic barrier to the seeking of health care. Geographic barriers related to preventive services for children, such as immunization, vitamin A supplementation and insecticide-treated bednets, seem to have been overcome, probably due to outreach activities. The distance barrier was especially strong for assisted deliveries, suggesting that the inclusion in the MHO package of transportation to health-care facilities for women about to give birth might be beneficial.

MHOs reached most parts of the population, and even though higher-income groups are more likely to enrol, MHOs do not exclude the poor. Analysis by household wealth quintiles showed that only membership of the richest quintile was a significant predictor of enrolment for households, individuals, and women of reproductive age, but no discrimination was seen among the other quintiles. Approximately half of the population in Sikasso commune and about 80% in Bla district fall below the poverty line, and MHO membership is drawn from a broad cross-section in both areas. While the very poor may have difficulty enrolling and paying premiums, they join as frequently as those in other quintiles, with the exception of the richest quintile. The outlay for 1 year of premiums plus co-payments for an entire household would average US$ 29–54 per year and represent approximately 2% to 3% of annual household income at the poverty line in Mali, and 2% to 8% of household cash consumption of MHO households. MHO membership reduced the variability of health-care spending and saved households money on care for fevers, although there was no reduction or savings for active members in terms of overall health spending.

In developing countries where health insurance coverage is generally limited to formal sector employees in urban areas, MHOs are a promising mechanism for reaching households in the rural and informal sector. This study has provided evidence of MHOs' positive effects on the utilization of many priority health services, on reaching many poor people, and on providing some income protection, even though MHOs may not achieve complete coverage of the poorest of all. Our results also demonstrate the need to address not only financial but also geographical barriers to care. Since the proportion of those eligible who joined MHOs in the study areas was well below 100%, efforts are needed both to expand coverage with MHOs and find alternative methods to improve financial access to health care.

Further research may be needed to validate our findings in other settings and to evaluate strategies to increase access for the poorest. In particular, results related to equity in MHO membership and the specific effects on service use should be confirmed in other settings. MHOs remain one viable mechanism, among others, to increase financial access to –and equity in– the utilization of essential health services. However, a more concerted effort from governments is needed to develop coherent strategies for MHO development, to develop and sustain MHO support capacities through effective partnerships, and to continuously learn from the experiences of other MHOs with respect to strengthening these organizations and their ability to reach the key target populations of women, children and the poor.

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Competing interests:

None declared.

References

1. Sachs JD, Ahluwalia IJ, Amoako KY, Aninat E, Cohen D. Diabre Z et al. *Macroeconomics and health: investing in health for economic development: report of the Commission on Macroeconomics and Health.* Geneva: World Health Organization; 2001.

2. Ndiaye P, Dia AT, Diedgiou A, Dieye EH, Dione DA. Socio-cultural determinants of the lateness of the first prenatal consultation in a

health district in Senegal. *Sante Publique* 2005;17:531-8.
PMID:16485434

3. Taffa N, Chepngeno G. Determinants of health care seeking for childhood
illnesses in Nairobi slums. *Trop Med Int Health* 2005;10:240-5.
PMID:15730508 doi:10.1111/j.1365-3156.2004.01381.x

4. Kamau N, Esamai FO. Determinants of immunization coverage among
children in Mathare Valley, Nairobi. *East Afr Med J* 2001;78:590-4.
PMID:12219965

5. Addai I. Determinants of use of maternal-child health services in rural
Ghana. *J Biosoc Sci* 2000;32:1-15. PMID:10676056

6. Develay A, Sauerborn R, Diesfield HJ. Utilization of health care in an
African urban area: results from a household survey in Ouagadougou,
Burkina Faso. *Soc Sci Med* 1996;43:1611-9. PMID:8961405
doi:10.1016/S0277-9536(96)00061-5

7. Lindelow M. The utilization of curative health care in Mozambique: does
income matter? *J Afr Econ* 2005;14:435-82. doi:10.1093/jae/eji015

8. Mugisha F, Bucar K, Dong H, Chepng'eno G, Sauerborn R. The two faces
of enhancing utilization of health-care services: determinants of patient
initiation and retention in rural Burkina Faso. *Bull World Health Organ*
2004;82:572-9. PMID:15375446

9. Onwujekwe O, Hanson K, Fox-Rushby JA. Who buys insecticide-treated
nets? Implications for increasing coverage in Nigeria. *Health Policy
Plan* 2003;18:279-89. PMID:12917269 doi:10.1093/heapol/czg034

10. Bennett S, Gamble Kelley A, Silvers B. 21 questions on CBHF: an
overview of community-based health financing [monograph on the
internet]. Bethesda, MD: Abt Associates Inc; 2004. Available from:
http://www.healthsystems2020.org/content/resource/detail/1320/
[accessed on 12 September 2008].

11. La concertation sur les mutuelles de santé. *Inventaire des mutuelles de
santé en Afrique : synthèse des travaux de recherche dans 11 pays
[Inventory of mutual health organizations in Africa : synthesis of
research in 11 countries]*. 2004. Available from:
http://www.concertation.org/gimi/concertation/showpage.do?page=%2F
concertation%2Fpublications%2Finventaires.wiki [accessed on 12
September 2008].

12. *Plan décennal de développement sanitaire et social 1998-2007 [Ten year
plan for social and health development 1998-2007].* Bamako:
Government of Mali; 1997.

13. Preker A, Carrin G. *Health financing for poor people: resource
mobilization and risk sharing*. Washington, DC: The World Bank; 2004.

14. Jakab M, Krishnan C. *Community involvement in health care financing: a
survey of the literature on the impacts, strengths, and weaknesses*
[HNP Discussion Paper for the Commission on Macroeconomics and
Health]. Washington, DC: The World Bank; 2001.

15. Tabor S. *Community-based health insurance and social protection policy* [Social Protection Discussion Paper Series No. 0503]. Washington, DC: The World Bank; 2005.

16. Baeza C, Montenegro R, Nunez M. *Extending social protection in health through community based health organizations: evidence and challenges*. Geneva: ILO-Universitas; 2002.

17. Carrin G, Waelkens MP, Criel B. Community-based health insurance in developing countries: a study of its contribution to the performance of health financing systems. *Trop Med Int Health* 2005;10:799-811. PMID:16045467 doi:10.1111/j.1365-3156.2005.01455.x

18. Ekman B. Community-based health insurance in low-income countries: a systematic review of the evidence. *Health Policy Plan* 2004;19:249-70. PMID:15310661 doi:10.1093/heapol/czh031

19. Jutting J. Do community-based health insurance schemes improve poor people's access to health care? Evidence from rural Senegal. *World Dev* 2004;32:273-88. doi:10.1016/j.worlddev.2003.10.001

20. Schneider P, Diop F. *Impact of prepayment pilot on health care utilization and financing in Rwanda: findings from final household survey.* Bethesda, MD: Partner for Health Reformplus Project, Abt Associates Inc; 2001. Available from: http://www.phrplus.org/Pubs/Tech002_fin.pdf [accessed on 12 September 2008].

21. Gumber A. *Hedging the health of the poor: the case for community financing in India* [Health, Nutrition and Population Discussion Paper]. Washington, DC: The World Bank; 2001.

22. Jowett M, Contoyannis P, Vinh ND. The impact of public voluntary health insurance on private health expenditures in Vietnam. *Soc Sci Med* 2003;56:333-42. PMID:12473318 doi:10.1016/S0277-9536(02)00031-X

23. Schneider P, Hanson K. Horizonal equity in utilization of care and fairness of health financing: a comparison of micro-health insurance and user fees in Rwanda. *Health Econ* 2006;15:19-31. PMID:16145721 doi:10.1002/hec.1014

24. Diop F, Yazbeck A, Bitran R. The impact of alternative cost recovery schemes on access and equity in Niger. *Health Policy Plan* 1995;10:223-40. PMID:10151841 doi:10.1093/heapol/10.3.223

25. Franco LM, Simpara CHT, Sidibe O, Kelley AG, Diop FP, Makinen M, et al. Evaluation of the impact of mutual health organizations on utilization of high impact services in Bla and Sikasso districts in Mali [monograph on the Internet]. Bethesda MD: Partners for Health Reform plus; 2006. Available from:http://www.phrplus.org/Pubs/Tech112_fin.pdf [accessed on 12 September 2008].

26. Gamble Kelley A, Kelley E, Simpara CHT, Sidibé O, Makinen M. *The Equity Initiative in Mali (IPE): reducing barriers to use of health services: findings on demand, supply, and quality of care in Sikasso and Bla*. Bethesda, MD: Partnerships for Health Reform; 2001.

27. Ballo MB, Traore SM, Niambele I, Ba S, Ayad M, Ndiaye S. *Enquête Démgoraphique et de Santé du Mali 2001* [Mali Demographic and Health Survey 2001]. Calverton, MD: Ministry of Health Mali and ORC Macro: 2002. Available at http://www.measuredhs.com/pubs/pub_details.cfm?ID=370 [accessed on 12 September 2008].

28. Deaton A, Zaidi S. *Guidelines for constructing consumption aggregates for welfare analysis* [Living Standards Measurement Study Working Paper No. 135]. Washington, DC: The World Bank; 2002.

29. *Cadre strategique de lutte contre la pauvrete* [Strategic framework for poverty reduction]. Government of Mali; 2002.

30. Smith KV, Sulzbach S. Community-based health insurance and access to maternal health services: evidence from three West African countries. *Soc Sci Med* 2008;66:2460-73. PMID:18362047 doi:10.1016/j.socscimed.2008.01.044

31. Chankova S, Sulzbach S, Diop F. Impact of mutual health organizations: evidence from West Africa. *Health Policy Plan* 2008;23:264-76. PMID:18480126 doi:10.1093/heapol/czn011

Table 1. Comparison of fees, benefits packages, membership and coverage in areas served by MHOs, Mali, 2003–2004

MHO characteristic	BlaVille[a]	Kemeni[b]	Wayerma[c]	Bougoula[d]
Fees[e]				
One-time enrolment fees per household	F 1 000 (US$ 1.90)	F 1 000 (US$ 1.90)	F 1 000 (US$ 1.90)	F 500 (US$ 0.95)
Monthly premiums per beneficiary	F 260 (US$ 0.49)	F 155 (US$ 0.29)	F 135 (US$ 0.26)	F 190 (US$ 0.36)
Benefits packages (% reimbursed)				
Consultation	75	75	75	75
Drugs	75	75	80	80
Normal delivery	75	75	75	75
Complicated delivery	100	100	100	100
Hospitalization	75	No	No	No
Membership and coverage (October 2004)				
Member households	218	126	850	276
Individual beneficiaries	875	374	6 508	915
Total population in MHO catchment area	27 805	8 223	57 275	27 514
Population covered (%)	4.1[f]	4.5	11.4	3.3

F, CFA franc; MHO, mutual health organization.

[a] Small urban centre and surrounding villages.

[b] Rural villages.

[c] Large urban centre and a few remote hamlets.

[d] Large urban centre.

[e] US$ 1 = 527 CFA francs at the time of the survey in 2004.

[f] 4.1 overall; 5.8 in Bla town; 0.4 in rural Bla.

Table 2. Sample sizes for all groups and by health-service target population in areas served by MHOs and a control area without MHOs, Mali, 2003–2004

Health service target	Bla			Sikasso[a]		Overall			Total
	M	NM	C	M	NM	M	NM	C	
Households	268	341	676	549	446	817	787	676	2 280
Individuals in households	2 113	2 157	4 473	3 663	2 604	5 786	4 761	4 473	15 020
Fever cases	251	268	611	299	272	550	540	611	1 701
Women 15–49 years old	405	393	819	125	163	530	556	819	1 905
Women who delivered in previous 12 months or pregnant	144	177	366	114	151	258	328	366	952
Women who delivered in previous 12 months	102	118	246	76	101	178	219	246	643
Children < 5 years old	294	270	486	135	215	429	485	486	1 400[b]

C, households in control area (no MHO access); MHO, mutual health organization; M, MHO member households; NM, MHO non-member households in areas with MHO access.

[a] The non-MHO access control group does not exist for Sikasso because the two MHOs cover the entire urban area.

[b] Data on the utilization of diarrhoea treatments, immunizations, vitamin A, and insecticide-treated bednets were available only on a subset of children younger than 5 years (i.e. those whose mothers were pregnant or delivered in the 12 months before the survey).

Table 3. Household characteristics in areas served by MHOs and a control area without MHOs, Mali, 2003–2004

Characteristic	Household membership in MHO (%)			Total (*n* = 2 280)
	MHO member (*n* = 817)	**MHO non-member in MHO catchment area (*n* = 787)**	**Control (*n* = 676)**	
Head of household				
Age (years)*				
≤ 24	3	6	4	5
25–34	17	27	31	28
35–49	39	37	34	36
≥ 50	41	30	31	31
Educational level*				
No education	26	43	61	49
Primary	43	47	38	43
Secondary	31	11	1	8
Ethnic group*				
Bambara	18	29	64	42
Senofo	43	34	10	25
Other	39	37	26	33
Female***	21	6	2	5
Occupation*				
None	21	17	10	15
Agriculture	21	25	83	48
Commerce	55	54	6	35
Other	3	4	1	3
Household				
Mean size	7.0***	6.0***	6.6***	6.3
Mean number women 15–49 years old	1.7***	1.4	1.4	1.4
Mean number children < 5 years old	0.9**	1.1**	1.4***	1.2
Religion				
Muslim	97	97	95	95
Other	3	3	5	5
Distance to health facility[a]* (km)**				
< 1	88	77	30	59
2–5	8	13	23	17
6–10	1	8	32	17
≥ 11	3	2	14	7
Residence*				

Rural	10	19	100	50
Small urban	13	14	0	9
Large urban	77	67	0	41
Mean per capita income[b]				
CFA francs	283 738	227 644	121 097	188 409
US$	538	432	230	358
Household wealth (consumption quintiles)[c]***				
Poor	5	12	33	20
Middle poor	12	16	27	20
Middle	17	21	19	20
Middle rich	25	24	14	20
Rich	41	27	7	20

*$P < 0.10$; **$P < 0.05$; ***$P < 0.001$. MHO, mutual health organization.

[a] Distance to the closest health facility is self-reported.

[b] Mean income was calculated based on family consumption divided by household size. US$ 1 = 527 CFA francs at the time of the survey in 2004.

[c] Income quintiles were determined by dividing the total study population in the 5 equally sized income groups.

Table 4. Odds ratios for the use of curative, maternal and preventive (no fee) health services by individual, household and community characteristics in areas served by MHOs and a control area without MHOs, Mali, 2003–2004

Independent variable	Type of service							
	Curative		Maternal			Preventive		
	Fever treatment *n* = 1 599	Diarrhoea treatment *n* = 284	Prenatal care *n* = 609	Assisted delivery *n* = 419	DPT3 *n* = 158 (age: 12–23 months)	Vitamin A *n* = 657 (age: 6–59 months)	ITN *n* = 1 261 (age: < 5 years)	ITN *n* = 902 (pregnant women)
Individual characteristic								
Up-to-date MHO coverage (R = not covered)	1.686**	3.014*	2.155*	1.083	1.416	1.060	2.129***	2.262**
Age of woman (years) (R = 20–35)								
≤ 19	NI	NI	0.797	0.866	NI	NI	NI	0.794
≥ 35	NI	NI	1.307	1.279	NI	NI	NI	0.972
Female (R = male)	0.870	1.046	NI	NI	4.028**	0.837	0.890	NI
Child < 5 years (R = age ≥ 5 years)	1.159	NI	NI	NI	NI	NI	NI	NI
Perceived seriousness (R = not serious)								
Serious	2.759***	NI	NI	NI	NI	NI	NI	NI
Very serious	4.018***	NI	NI	NI	NI	NI	NI	NI
Household characteristic								
≥ 2 women aged 15–49 years (R = 1)	NI	NI	0.724	0.717	NI	NI	NI	1.095
Female head of household (R = male)	1.200	1.451	1.277	Dropped[a]	0.617	0.077***	0.864	1.199
Head of household aged ≥ 50 years	NI	NI	1.461	3.121**	NI	NI	NI	0.563

(R = age < 50 years)								
Household head with primary education or higher (R = no education)	0.870	0.907	1.222	1.795*	0.274**	1.175	1.067	1.456
Woman with primary education or higher (R = no education)	NI	0.881	1.476	1.030	3.422*	0.817	1.440*	1.979**
Ethnic group (R = Bambara)								
Senofo	1.475*	2.191	0.991	1.605	1.153	0.971	1.131	0.942
Other	1.246	2.215	0.891	1.564	2.576	1.334	1.005	0.944
Household wealth (R = poor)								
Middle poor	0.606**	1.045	0.712	1.816*	0.188**	0.981	0.916	1.009
Middle	1.053	1.885	0.871	1.206	0.305	0.792	1.158	1.639*
Middle rich	1.120	1.699	0.892	1.719	0.314	1.523	1.096	0.795
Rich	1.553*	3.660	0.665	3.166*	0.536	1.461	1.749	0.711
Community characteristic								
Access to an MHO (R = no)	0.826	2.059	0.964	1.994	1.977	1.192	1.197	2.243***
Distance to health facility (km) (R = ≤ 1)								
2–5	0.578**	0.800	0.692	0.305***	0.747	0.922	1.016	1.431
6–10	0.511***	0.712	0.279***	0.176***	0.556	0.921	0.470***	0.857
≥ 11	0.541*	0.819	1.157	0.231***	Dropped[a]	2.360*	1.499	2.722**
Urban/rural residence (R = rural)								
Large urban	1.802**	0.380	1.437	0.636	0.164*	1.419	0.317***	0.109***
Small urban	0.638	0.133*	0.927	1.205	1.060	1.172	0.804	0.989

*$P < 0.10$; **$P < 0.05$;. ***$P < 0.01$. MHO, mutual health organization; DPT3, diphtheria-pertussis-tetanus 3 vaccination; ITN, insecticide-treated nets; MHO, mutual health organization; NI, variable not included in regression analysis; R, reference category.

[a] Variable dropped by STATA programme during analysis.

Table 5. Odds ratios for enrolment in a MHO according to individual, household
and community characteristics in areas served by MHOs and a control area
without MHOs, Mali, 2003–2004

	Enrolment			
Independent variable	Households $n = 1\ 493$	All individuals $n = 9\ 813$	Women aged 15–49 years $n = 1\ 033$	Children aged < 5 years $n = 740$
Individual characteristic				
Female sex (R = male)	NI	0.965	NI	0.908
Age ≥ 50 years (R = age < 50 years)	NI	1.241**	NI	NI
Women of reproductive age (15–49 years old) (R = no)	NI	1.103	NI	NI
Child < 5years (R = ≥ 5 years)	NI	0.893	NI	NI
Age of woman (years) (R = 20–34)				
≤ 19	NI	NI	0.622	NI
≥ 35	NI	NI	1.394	NI
Age of child (months) (R = ≥ 24)				
0–11	NI			0.554***
12–23	NI			1.335
Self-reported health status (R = excellent)				
Average to bad	1.664**	1.240	1.661	1.223
Good	1.337	1.110	1.248	1.250
Chronically ill (R = no)	1.372	1.360**	1.222	0.712
Handicapped (R = no)	1.208	1.624**	2.969	2.823
Household characteristics				
Household size	1.093**	1.071***	1.087*	1.119**
≥ 2 women aged 15–49 years (R = 1)	NI	NI	1.123	NI
No. of children < 5 years (R = 0–1)				
2	0.851	NI	NI	NI
≥ 3	0.591*	NI	NI	NI
No. of women 15–49 years (R = 0–1)				
2	0.921	NI	NI	NI
3	1.347	NI	NI	NI
≥ 4	2.264**	NI	NI	NI
No. of elders[a] (R = 0–1)				
2	0.965	NI	NI	NI
≥ 3	1.266	NI	NI	NI
Female head of household (R =	5.574***	5.169***	4.386***	8.249***

male)

Age of head of household (years) (R = < 25)				
25–34	1.185	0 899	NI	NI
35–49	1.828	1.379*	NI	NI
≥ 50	1.473	1.107	NI	NI
Head of household aged ≥ 50 years (R = < 50 years)	NI		1.010	0.716
Ethnic group of household head (R = Bambara)				
Senofo	1.819***	2.148***	2.934***	4.896***
Other	1.618**	1.908***	2.062**	2.902**
Household head with primary education or higher (R = no education)	2.388***	2.225**	1.516	1.019
Occupation of head of household (R = none)				
Agriculture	1.793**	1.736***	1.825	1.465
Commerce/administration	0.073	0.949	3.709***	0.875
Other	1.477	1.426	3.795*	1.712
Occupation of woman (R = none)				
Agriculture	NI	NI	1.086	0.586
Commerce/administration	NI	NI	1.192	0.707
Other	NI	NI	0.241**	0.274
Woman/caretaker with primary or higher education level (R=no)	NI	NI	2.721***	2.630***
Household wealth (R=poor)				
Middle poor	0.826	0.992	0.566*	0.751
Middle	1.104	1.367	1.039	1.949
Middle rich	0.810	0.815	0.970	0.686
Rich	1.704***	1.623**	2.276**	1.473
Community characteristics				
Distance to health facility (km) (R = ≤ 1)				
2–5	0.493***	0.498**	0.333***	0.452
6–10	0.174***	0.246***	0.122***	0.265*
≥ 11	1.720	3.421**	0.775	5.002
Urban/rural residence (R = rural)				
Large urban	0.630*	1.423***	0.083***	0.631
Small urban	0.614	1.354***	0.637	0.732

*P < 0.10; **P < 0.05; ***P < 0.01. MHO, mutual health organization; NI, variable not included in regression analysis; R, reference category.

[a] People aged ≥ 50 years.

Table 6. Regression coefficients for health-care expenditure (annual household and at time of service for fever) by individual, household and community characteristics in areas served by MHOs and a control area without MHOs, Mali, 2003–2004

	Household expenditure on health n = 2 164	Household health expenditure out of total consumption n = 2 139	Out- of-pocket expenses for all types of fever treatment n = 1 596	Out-of-pocket expenses for modern fever treatment n = 599
Active MHO member (R = no)	0.279	–0.141*	–0.637*	–1.228**
Individual characteristic				
Female sex (R = male)	NI	NI	–0.141	–0.423
Age $\geq$ 50 years (R = age < 50)	NI	NI	–0.045	0.124
Child < 5 years (R = age $\geq$ 5)	NI	NI	–0.568**	–0.530
Severity of illness (R = not serious)				
Serious	NI	NI	1.370***	0.579
Very serious	NI	NI	1.958***	–0.531
Household characteristic				
Self-reported average-to-bad health status (R = good-to-excellent)	0.018	–0.010	NI	NI
$\geq$ 1 person chronically ill (R = 0)	–0.428	–0.208	NI	NI
$\geq$ 1 person handicapped (R = 0)	0.769	0.189	NI	NI
Household size	–0.035	0.071	0.042	0.059
$\geq$ 2 children aged < 5 years in household (R = 0–1 child)	0.441	0.122	NI	NI
$\geq$ 2 women aged 15–49 years (R = 1)	–0.235	–0.049	NI	NI
$\geq$ 2 elders[a] in household (R = 0–1)	–0.127	0.002	NI	NI
Female head of household (R = male)	–1.283*	–0.183	–0.658	–1.017
Ethnic group of head of household (R = Bambara)				
Senofo	–0.651*	–0.108	0.881	0.006
Other	0.084	–0.020	0.251	0.472
Education of head of				

household (R = no education)				
Primary	0.979***	0.162**	0.430*	0.742
Secondary or greater	2.119***	0.390***	NI	NI
Occupation of head of household (R = none)				
Agriculture	−0.221	−0.117	−0.571	−1.269**
Commerce/administration	−0.112	−0.132	0.103	−0.634
Other	−0.650	−0.196	2.127***	1.465
Household wealth (R = poor)				
Middle poor	0.451	0.172*	−0.132	−0.638
Middle	0.766*	0.218**	0.331	−0.272
Middle rich	1.338***	0.296***	0.239	−0.044
Rich	3.558***	0.669***	1.167***	0.268
Community characteristic				
Access to health facility (km)				
(R = ≤1)				
2–5	−0.489	−0.222**	−0.376	−0.344
6–10	−0.764*	−0.209*	−0.456	−0.769
≥ 11	−0.128	−0.008	−0.416	0.531
Urban/rural residence (R = rural)				
Large urban	−1.477***	−0.580***	0.359	−0.798
Small urban	−1.338**	−0.574***	−0.287	−1.042
Constant created by STATA	3.964***	1.193***	2.520***	6.670***

MHO, mutual health organization; NI, variable not included in regression analysis.

*$P < 0.10$; **$P < 0.05$; ***$P < 0.01$.

[a] People aged ≥ 50 years.

Table 7. Characteristics of annual household spending on health in US dollars (US$) among MHO members and the entire community in areas served by MHOs, Mali, 2003–2004

Measure	Bla		Sikasso		Overall
	MHO member	All Bla	MHO member	All Sikasso	Total sample
A. Health expenditures[a] (mean)	129	108	164	172	134
B. Health expenditures[a] (median)	46	15	30	23	17
C. Health expenditures out of total cash[b] (mean %)	6.4	8.9	5.6	6.2	7.8
D. Health expenditures out of total cash[b] (median %)	3.2	2.6	1.7	1.5	2.1
Ratio of mean health expenditures to median health expenditures (A/B)	2.8	7.2	5.5	7.5	7.9
Ratio of mean health expenditures out of total cash[b] to median health expenditures out of total cash[b] (C/D)	2.0	3.4	3.3	4.1	3.7

MHO, mutual health organization

[a] US$ 1 = 527 CFA francs at the time of the survey in 2004.

[b] Annual cash expenditure is used as the denominator here, rather than total value of consumption (which includes self-produced items), since health expenditures must be made in cash.

Table 8. Mean household cash income and estimated household annual
expenditure in US dollars (US$) on MHO premiums and co-payments in areas
served by MHOs, Mali, 2003–2004

Estimate in US$	Bla		Sikasso	
	Kemeni (458)[a]	BlaVille (850)[a]	Wayerma (1 359)[a]	Bougoula (1 359)[a]
Annual expenditure on MHO premiums and co-payments per household[b,c]				
Based on current beneficiaries (% of household enrolled)	15.56 (43)	33.80 (62)	24.71 (79)	19.72 (67)
With entire household enrolled	36.31	54.22	31.12	29.34
MHO expenditures as percent of cash income				
Based on current beneficiaries	3.4	4.0	1.8	1.5
With entire household enrolled	7.9	6.4	2.3	2.2
Actual health expenditure as percent of total cash consumption				
Median		2.6		1.5
Mean		8.9		6.2

MHO, mutual health organization.

[a] Figures in parentheses are estimated mean household cash income.

[b] These expenditure estimates are lower than those in Table 8 because here costs related to care not covered by the MHO (such as self-care and hospitalization in all MHOs but BlaVille) are not included.

[c] US$ 1 = 527 CFA francs at the time of the survey in 2004.