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**Community-Based Health Insurance Schemes**  
A Systematic Review

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# Community-Based Health Insurance Schemes: A Systematic Review

Anagaw Derseh Mebratie<sup>a</sup>, Robert Sparrow<sup>b</sup>, Getnet Alemu<sup>c</sup>, Arjun S. Bedi<sup>d</sup>

## Abstract

Due to the limited ability of publicly financed health systems in developing countries to provide adequate access to health care, community-based health financing has been proposed as a viable option. This has led to the implementation of a number of Community-Based Health Insurance (CBHI) schemes, in several developing countries. To assess the ability of such schemes in meeting their stated objectives, this study systematically reviews the existing empirical evidence on three outcomes – access to schemes, effect on health care utilization and effect on financial protection. In addition to collating and summarizing the evidence we analyse the link between key scheme design characteristics and their effect on outcomes and comment on the role that may be played by study characteristics in influencing outcomes. The review shows that the ultra-poor are often excluded and at the same time there is evidence of adverse selection. The bulk of the studies find that access to CBHI is associated with increased health care utilization, especially with regard to the use of relatively cheaper outpatient care services as opposed to inpatient care. The schemes also appear to mitigate catastrophic healthcare expenditure. There are clear links between scheme design and effectiveness suggesting the importance of involving the target population in designing and implementing CBHI schemes.

**Key words:** Catastrophic health expenditure, community health insurance, low-income groups

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## 1. Introduction

Increased expenditure caused by the need to cope with injury and illness has been identified as one of the main factors responsible for driving vulnerable households further into poverty (WHO, 2000). According to Meghan (2010), more than half of health expenditure in poor countries is covered by out-of-pocket (OOP) payments incurred by households. An increase in such expenditure can have catastrophic effects and may deplete a household's ability to generate current and future income and have inter-generational consequences as households may be compelled to incur debt, sell productive assets, draw down buffer food stocks, or sacrifice children's education. Foregoing medical care may lead to long lasting illness, disability or even death (see O'Donnell et al., 2005; De Weerd and Dercon, 2006; Flores et al., 2008).<sup>1</sup>

Since the late 1990s, due to the limited ability of publicly financed health systems in developing countries to provide adequate access to health care and the shortcomings of informal coping strategies to provide financial protection against health shocks, in the international development discourse (for instance see WHO, 2000) various forms of community-based health care financing have been proposed as an alternative approach.<sup>2</sup> This increasing policy attention has led to the implementation of a number of Community-Based Health Insurance (CBHI) schemes, in several developing countries (Wiesmann and Jutting,

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<sup>1</sup> The World Health Organization defines health expenditure as *catastrophic* if the share of a household's total expenditure on health care services is more than 40 percent of household's capacity to pay. A household's capacity to pay is measured by its total non-food expenditure (for details, see Karami et al., 2009).

<sup>2</sup> The definition of community is often not clear and Dror and Preker (2002, p. 2) treat it as "a generic expression used to cover a large variety of health-financing arrangements". Based on our reading of the literature we define the community in terms of the target population which a particular scheme is trying to reach and community-based in terms of involving the community in some or all aspects of the scheme. The range of arrangements which are placed under the rubric of Community-Based Health Insurance schemes is discussed later on in the review.

2001; Defourny and Failon, 2008). Typically, such CBHI schemes are non-profit initiatives built upon the principles of social solidarity and designed to provide financial protection against the impoverishing effects of health expenditure for low-income households in the informal urban sector and in rural areas (Ahuja and Jütting, 2004; Carrin et al. 2005; Tabor, 2005; Jacobs et al., 2008).

Matching the roll-out of these schemes, theoretical and especially empirical studies which examine their impact on outcomes such as utilization of healthcare, financial protection, resource mobilization and social exclusion have proliferated. Existing reviews of this body of work are provided by Jakab and Krishnan (2001), Preker et al. (2002) and Ekman (2004). Based on 45 published and unpublished works, Jakab and Krishnan (2001) conclude that there is convincing evidence that community health financing schemes are able to mobilize resources to finance healthcare needs, albeit there is substantial variation across schemes. They also argue that the schemes are effective in terms of reaching low-income groups although the ultra-poor are often excluded.<sup>3</sup> Preker et al. (2002), reach a similar conclusion and point out that there is strong evidence that CBHIs are successful at mobilizing resources, enabling access to care for the poor and providing financial protection.

Although both these papers paint a positive picture of the potential of CBHIs in meeting their policy goals they also point out the need for stronger evidence on the performance of CBHIs as long-term viable health care financing instruments. As opposed to these two narrative reviews, Ekman (2004) provides a systematic review of the literature

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<sup>3</sup> While there are no universally accepted definitions of ultra-poor there are several context specific definitions. For instance, Lipton (1983) uses the term to indicate households who are not able to obtain more than 80 percent of their caloric requirements. Similarly, Ahmed et al. (2007) defines the concept in terms of daily income below USD 0.50 (at constant 1993 PPP USD).

based on 36 studies conducted between 1980 and 2002.<sup>4</sup> Ekman (2004) finds that while CBHI do provide financial protection for low income groups and increase cost recovery for health service providers the magnitude of the effect is low and the lowest income groups are excluded from enrollment. Moreover, there is no evidence that the schemes are associated with an increase in the quality of care. On a methodological note, Ekman (2004) concludes that the evidence base to develop stylized facts is questionable and only five studies included in his review may be considered of high-quality.<sup>5</sup> These studies are labelled high-quality studies primarily as they attempt to use econometric methods, albeit on cross-section data, to identify the effect of CBHI on various outcomes.

Motivated by the continued attention given to such schemes as a way of financing health care, the aim of this review is to provide an updated and systematic assessment of studies that have examined the impact of CBHI schemes, and on the basis of this body of evidence take stock, among other issues, of the role of such schemes in enhancing access to health care and providing financial protection. The paper relies on 46 micro level studies that have been published or have become publicly available between 1995 and 2012 and cover a range of low and middle income countries. Unlike the previous reviews, the current study focuses mainly on papers that have used quantitative methods to identify impact.<sup>6</sup> The

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<sup>4</sup> Among others, a systematic review is characterized by a study protocol which lays out specific research questions to be addressed, pre-defined inclusion criteria for studies, a systematic search strategy to find and include studies that fulfil the criteria and an assessment of the quality/validity of the findings through an assessment of the methodological features of the literature.

<sup>5</sup> Of the 36 papers reviewed by Ekman (2004), five studies (Carrin et al., 1999; Criel and Kegels, 1997; Jowett et al., 2003; Jutting, 2001; Ranson, 2002) are considered high-quality. The first two are based on descriptive statistics and the remainder use econometric methods. However, all three studies that use regression analysis are based on cross sectional data and only one study (Carrin et al., 1999) uses longitudinal data.

<sup>6</sup> The definition of 'impact' is limited to examining the effect of CBHI schemes on the beneficiaries and does not include the impact on providers in terms of cost recovery and resource mobilization for the health financing system.

specific objectives of the study are to: (i) examine the impact of CBHI on inclusion of lower income groups and adverse selection in enrolment, on healthcare utilization and on OOP expenditure (ii) examine the extent to which variations in outcomes may be related to key scheme design characteristics – an issue which has policy implications but which has not been systematically investigated (iii) scrutinize the research methodology of the various studies and comment on the potential effects of the study design on the empirical findings.

The paper unfolds by providing, in section 2, a description of the key characteristics of some common types of community based health insurance schemes. This is followed by an account of the protocol used to produce the review (section 3), findings are in section 4, and a discussion of methodological concerns appears in section 5. The final section concludes the paper.

## **2. Community-based health insurance – a brief taxonomy**

Community-based health insurance is a generic term for a variety of resource mobilization models designed to finance access to health care through a greater involvement of the target population in the design and implementation of the scheme as compared to private or national-level health insurance schemes (for details see Jakab and Krishnan, 2001; Preker et al., 2002).

The most common forms of community health financing schemes are (i) Community prepayment health organizations (ii) Provider based health insurance and (iii) Government-run but community-involved health insurance. These schemes differ in terms of design and the involvement of the community in setting up the scheme, mobilizing resources, management and supervision. The remainder of the section characterizes these different schemes and highlights the role of the community in each scheme type while Table 1 provides a snapshot of various scheme characteristics.

### *2.1 Community prepayment health organizations*

These types of health organizations are characterized by voluntary membership and payments are made in advance in order to cover potential medical costs. Members of the schemes pay premiums on a regular basis, usually when their incomes are high. Such schemes are often initiated with the technical and financial support of NGOs and thereafter the community takes full responsibility for administering and managing the scheme. Local governments may also play a role in encouraging and supporting the efforts of such schemes. The community participates in designing the scheme and decides on the level of benefit and the corresponding premium. In addition, members participate actively in administration and supervision (Arhin-Tenkorang, 2001).

Sixteen studies in the current review examine the impact of community prepayment health organizations (see Table 2). While such schemes often rank high in terms of community involvement they tend to cover a limited geographical area and often cover only cheaper outpatient care services due to difficulties associated with mobilizing a large enough population. While community involvement is a purported strength of this approach it is also a weakness as the establishment and continuity of such schemes depends on social solidarity and trust amongst community members.<sup>7</sup> Poor management and accounting skills may also undermine the sustainability of such schemes.

### *2.2 Provider based health insurance schemes*

These types of health insurance schemes are initiated by healthcare providers (such as a town or regional hospitals) to encourage utilization of healthcare services. This review contains seven studies which may be placed under this rubric (see Table 2). The schemes mainly cover

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<sup>7</sup> For instance, in such a scheme in Kenya's Kilifi district, households reported that they were not interested in renewing their membership since they feel that corruption affects management (Molyneux et al., 2007).

expensive inpatient care and hospitals and may have recourse to external funds to subsidize service costs. In this framework, the health care providers are responsible for mobilizing resources and providing health care services. The role of the community in designing and administering the scheme is limited. However, members of the schemes are given a chance to participate in scheme supervision and provide feedback on service quality through meetings organized by the health care providers. Such schemes are often restricted to those households living in the catchment area of a health facility (see Arhin-Tenkorang, 2001).

### *2.3 Government run community-involved health insurance*

Government run and community-involved health insurance schemes are often linked to formal social insurance programmes with the objective of creating access to a universal health care system (Jakab and Krishnan, 2001). Unlike other models, government initiated schemes often cover both basic curative and inpatient care. The government (national or regional) plays a substantial role in initiating, designing and implementation of such schemes (Arhin-Tenkorang, 2001). The participation of the community in such schemes varies substantially across countries. Some governments create conditions which enable community involvement in defining the benefit package, setting of premiums and scheme management while others introduce the schemes in a top-down manner and limit the role of the community. Membership in such government-initiated health insurance may not always be voluntary. Twenty five studies in this review fall in the category of government-run models of community health insurance schemes.<sup>8</sup>

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<sup>8</sup> The total number of studies reported here is 48 (i.e, 16 community prepayment health organizations, 7 health care provider initiated insurance schemes, and 25 government run and community involved health insurance schemes). However, Table 2 covers 46 studies. The difference is because the scheme type in one study (Onwujekwe et al. 2009) is not known and each of three studies (Desmet 1999, Diop et al. 2006, Gumber 2001) examines two different types of schemes.

Unlike other forms of CBHI, government supported health insurance schemes have the potential to reach a relatively large number of households. Governments in co-operation with donor agencies may provide reductions in premium and fee waivers for the poorest segments of society while retaining a universal benefit package. The disadvantage of these schemes may lie in their design and implementation features. Since such programmes are the result of a top-down approach, they may not be sensitive to local needs. Limiting the role of community participation in awareness-raising, decision-making and supervision probably robs such schemes of a sense of ownership which in turn may hamper sustainability.

### **3. Conducting the review**

This study applies the basic principles of a systematic review in order to assess the literature on the impact of CBHI schemes.<sup>9</sup> Unlike a narrative approach, systematic reviews attempt to assess the overall message or develop stylized facts on the basis of knowledge emerging from existing studies while at the same time controlling for or commenting on methodological features of the literature that may influence the conclusions. The protocol followed in this review is as follows:

1. The specific research aim was defined as a review which will provide a synthesis of the existing knowledge on community health financing approaches in dealing with three issues - access to schemes or social inclusion, and their effect on health care utilization and financial protection.
2. Source of the data: published and unpublished papers over a 18 year period (1995 to 2012) located through a search of 6 databases — Econlit, PubMed, Science Direct,

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<sup>9</sup> The detailed protocols are described by Green et al. (2008). Ekman (2004) also uses a systematic review approach and adapts the methods proposed by Clark and Oxman (2002), AHRQ (2002), and McKee and Britton (1997).

SSRN, JSTOR, and Google scholar. In addition, a search was conducted on the web pages of the World Health Organization.

3. To identify papers for review a search was conducted using the key words ‘community health financing’, ‘micro-insurance’, ‘OOP payment and community insurance’, ‘community-based health insurance’. This generated a large number of papers (several hundred) whose titles and abstracts were examined and introductions and conclusions were perused for suitability of inclusion. Using this approach, 121 potential papers were selected and passed to the second round for intensive reading.
4. Papers included for detailed review needed to satisfy the following criteria:
  - 4.1 They should be concerned with an examination of the impact of community health financing schemes on access to health care and financial protection. The definition of ‘community health financing schemes’ was restricted to non-profit oriented schemes that serve populations in the informal sector (urban or rural) of low and middle income countries.<sup>10</sup> This restriction led to the exclusion of 21 of the 121 papers.
  - 4.2 Studies that use micro data at the household or individual level (led to the exclusion of 12 studies).
  - 4.3 Studies that evaluate the effect of community health insurance mainly using quantitative and statistical analysis. Studies relying mainly on qualitative studies were included provided they used at least some statistical information (16 studies excluded).

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<sup>10</sup> According to the World Bank (2011) classification of economies based on 2010 GNI per capita, the countries covered in our review lie in one of the following categories: low income countries, \$1,005 or less (like Afghanistan, Burkina Faso, and Mali); lower middle income countries, \$1,006 - \$3,975 (like India, Nigeria, and Lao); upper middle income countries, \$3,976 - \$12,275 (China and Mexico).

4.4 Studies that arrived at their findings based on value judgement and self-perception without using any data were excluded. Similarly, studies that did not provide clear information on the research methods applied and the schemes studied in their analysis were excluded (7 studies excluded).

4.5 The outcome measures should include utilization of health care (outpatient and inpatient) services, OOP healthcare payments, adverse selection, and social exclusion in enrolment and service utilization (19 studies excluded).

The imposition of these criteria led to a list of 46 papers (32 published and 14 unpublished) that were retained for the review.<sup>11</sup> Compared to Ekman (2004), 37 of the papers included in the review are different.

5. After paper selection, the papers were read and carefully scrutinized. A data extraction template was developed to collect information from each paper about scheme impact, the characteristics of the scheme (type of scheme, whether the scheme receives external support, whether there are contracts with providers, extent of community participation), the statistical/research methods applied, data characteristics (source, level of analysis, data type, the use of baseline information). A summary of the key features of each of these studies is provided in Table 2.
6. Analysis: The limited number of studies impedes a formal meta analysis which links outcomes to scheme characteristics and study characteristics. However, to assess the overall message emerging from the studies, univariate and bivariate distributions were constructed. These are used to construct stylized facts.

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<sup>11</sup> All studies that meet the selection criteria are included in the review. In some cases the same scheme has been studied in more than one paper although over different time periods, study outcomes, and the use of different methods.

## 4. Review results

The key data emerging from the review are laid out in Tables 3 to 6. A brief discussion on each of the issues under scrutiny is provided below.

### *4.1 Participation, social exclusion and adverse selection*

Scheme participation, which is linked to cost-recovery, varies considerably across schemes and also within schemes across different sites. The largest scheme included in the survey covers 406 million individuals while the smallest includes only 600. Scheme coverage as a share of the target population, for the schemes that provide such information, ranges from 1 percent to 100 percent. The unweighted mean is 37.2 percent (see Table 2). While this may not seem impressive, given the intended target for such schemes (rural and informal sector workers) and the potentially limited exposure to insurance/financial services this may be considered a high uptake rate.

Turning to the issue of who participates, a majority of the papers (61 percent) find statistically significant evidence to support the claim that the ultra-poor are excluded from CBHI schemes. Even when such households become members, they tend to use healthcare services less intensively as compared to higher income groups potentially due to their inability to afford co-payments and other related costs (transportation and forgone income). About 67 percent (see Table 3) of the studies find evidence that individuals suffering from chronic health conditions are more likely to join CBHI schemes as compared to those in good health. While this may be expected and considered a positive aspect from the perspective of the beneficiaries, it also signals the need to account for such risks in the management of CBHI schemes. To control for adverse selection a number of schemes allow enrolment only at the household rather than the individual level and/or promote group registration at the village level. Other schemes introduce a waiting period before new

members can receive assistance in order to discourage opportunistic scheme uptake (Wiesmann and Jutting, 2001).

#### *4.2 Utilization of healthcare services*

Consistent with the results of previous reviews our analysis shows that 74 percent of the studies (26 out of 35) find positive and statistically significant CBHI membership effects on health care utilization.<sup>12</sup> The effect differs across the type of health care services and supports the idea that such schemes are somewhat more effective in extending access to outpatient as compared to inpatient care – 75 percent of the studies find an effect on outpatient care while the corresponding figure for inpatient care is 64 percent. In terms of magnitude, the increase in outpatient care utilization for insured versus uninsured ranges from 4.3 to 10.5 percentage points and for inpatient care utilization from 1.1 to 6.9 percentage points. While the utilization of preventive and curative outpatient care may reduce the need for inpatient care (Yip et al., 2008) it is likely that the difference in the CBHI effect across types of care is due to differences in coverage for the two types of services. Several CBHI schemes do not cover both types of care and if they do, inpatient care coverage has a high co-payment arrangement which is like to dissuade health care use.

#### *4.3 Financial protection*

Sixteen studies have examined the impact of the schemes on out-of-pocket payment and seven papers looked at the effect of the schemes on catastrophic health expenditure. 56 percent of such studies conclude that the schemes have been successful at reducing OOP healthcare payments and in 86 percent of the cases in preventing catastrophic health expenditure. For those papers where the effect is statistically significant, the reduction in OOP expenditure ranges between 12 to 35 percent.

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<sup>12</sup> Utilization includes three types of outcome measures (outpatient care, inpatient care and overall utilization). Some studies examine the impact of the scheme on outpatient and inpatient care separately while some group them together.

#### *4.4 Scheme characteristics and scheme effects*

A clear feature emerging from the analysis is the high degree of variation in outcomes across schemes. The pertinent policy issue is perhaps not so much whether CBHI schemes enhance access and provide financial protection but what are desirable scheme design features. This is difficult to analyse as details on scheme design are not readily available, however, we attempt to do so by providing a tabulation of various scheme characteristics and their associated effects on the outcomes of interest (see Table 4).

*Scheme type:* There appears to be a clear link between scheme type and outcomes. Government-run community-involved schemes appear to be less effective in terms of reaching out to marginalized groups as compared to community pre-payment schemes. Six of the 7 government-schemes tend to exclude the ultra-poor as compared to 5 of the 10 community-run NGO-supported schemes. Consistent with this pattern the studies show that government-run schemes are somewhat more successful (11 out of 14) at ensuring health care use (conditional on enrolment) as compared to community-run (11 out of 16) schemes. We also find that government-run insurance interventions are more effective in providing financial protection for beneficiaries, although this does not account for the exclusion of the ultra-poor.

*External financing:* CBHIs differ in their financing source. Some schemes are entirely dependent on member contributions while others receive external funds in order to ensure financial sustainability and to subsidise premiums for potential beneficiaries. Access to such funds appears to be positively associated with increase in utilization (17 out of 21) and reduction in OOP expenses (6 out of 9). Schemes with external support seem to be less effective in terms of reducing social exclusion (only 4 out of 11 studies with external funds finds a reduction in the inclusion of the poor). This pattern suggests that subsidies are

benefiting the relatively wealthier members of the community and highlights the need for more effective targeting of such funds. While access to external support may have a short-run beneficial effect, continued reliance on such subsidies may undermine the sustainability of such schemes.

*Contract with providers:* While some community health financing schemes do not place restrictions on obtaining medical treatment from health providers in a given geographical area others sign contracts with local providers and restrict access. Such arrangements may lead to price discounts although their effect on quality of care is not so clear. The review suggests that such contractual agreements increase utilization of health care and reduce the burden of OOP payments. Since almost all the schemes under review have signed agreement with providers it is hard to discern a provider effect.

*Community participation:* In principle it would seem redundant to examine the link between community participation in community-based health financing as the target population is expected to be engaged in various aspects of such schemes. However, as discussed in section 2, the extent to which potential beneficiaries participate in the design, implementation, management, and supervision activities varies across schemes. Providing space for community participation may have an impact on the willingness of individuals to buy insurance and the overall performance of the scheme. The review reveals that participation of the community in design and implementation has a positive impact on healthcare utilization and financial protection. For instance, all 9 schemes in which communities have a role in programme design are associated with an increase in access to healthcare and 4 out of 5 display a reduction in OOP expenditure. The corresponding figures for schemes without such participation are 6 out of 11 and 1 out of 4 for utilization and OOP expenditure, respectively. Participation of members in management and supervision activities is also

linked with increases in access to healthcare service (7 out of 7) as opposed to 9 out of 14 for schemes where members are not involved.

*Link with microfinance institutions:* As discussed above, several microfinance institutions provide micro insurance service for their members. Six studies in this review evaluate the impact of CBHI schemes which are embedded in microfinance institutions.<sup>13</sup> Albeit the number is small, such schemes appear to be effective in terms of expanding utilization and in ensuring equitable access to health insurance.

## **5. Methodological concerns**

So far the information and in particular the estimates obtained from the CBHI literature have been taken at face value. However, a reading of the papers raises at least two concerns, especially if the aim is to identify the causal impact of the schemes on various outcomes.

First, in the case of most CBHI schemes, enrolment is voluntary and there is clear evidence of exclusion of the ultra-poor and the higher enrolment of individuals with existing medical conditions. However, many studies not account for this pattern of self-selection and hence ignores the consequences of estimating the impact of CBHI on health care use and financial protection based on self-selected samples. Without accounting for this pattern of self-selection it is difficult to argue that the estimates of CBHI on health utilization and financial access should be interpreted as causal effects.

To provide a systematic assessment along this dimension, Table 5 groups the methods used in the reviewed studies into four categories. These consist of studies that (i) Control for potentially confounding observed and unobserved factors that may influence program outcomes and scheme uptake using techniques such as difference-in-difference

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<sup>13</sup> Gumber (2001), Ranson (2002), Dror et al. (2009), Ranson et al. (2006), Levine et al. (2012), and Hamid et al. (2011).

(DiD), Instrumental Variables (IV), and Heckman selection models (ii) Studies that have used econometric analysis (Propensity Score Matching, OLS, logit, probit) to control for a number of potentially confounding observed variables that may influence outcomes and scheme uptake (iii) Studies that have analysed differences in means of outcome variables across insurance status and tested whether these are statistically significant (iv) Studies that have analyzed differences in means without conducting any statistical test. Only 6 of the 43 estimates on utilization, the most widely used outcome, fall in the first category. The most common approach is to control for a range of observed characteristics which may have a bearing on outcomes and on scheme uptake (19 of 43 in the case of health utilization) but to ignore (unobserved) selection effects. The upshot is that, potentially, most of the studies in the review are likely to overestimate the effect of CBHI on utilization (since the analysis is based on samples predisposed to using more health care) and underestimate the financial protection effect (sample excludes the ultra-poor).

Second, the bulk of the studies rely on a single or repeated cross-section data for their analysis. Only 6 of the 25 studies that apply regression methods have used panel data and 5 of these studies use baseline information (Table 6). Access to longitudinal data is important from a policy and a methodological perspective. Access to such data permits dynamic analyses and are essential to gauge the long-term feasibility of such schemes. At the same time longitudinal information makes it easier to control for unobserved heterogeneity/selection effects which may have a bearing on outcomes and enrolment.

Based on his review, Ekman (2004) concluded that, “overall, the evidence base is limited in scope and questionable in quality” and only 5 of the 36 papers reviewed were considered high quality. Since then there has been a clear improvement in the quality of the literature. For instance, 25 of the 43 studies on utilization now use statistical regression

analysis, an important marker of quality in Ekman's quality assessment protocol. However, the burden of proof needed to obtain convincing effects has also risen since 2004. Based on current standards a convincing causal analysis of interventions such as the CBHI calls for the use of baseline and follow up data, information on treatment and valid control groups and the use of appropriate statistical methods to control for the endogenous nature of CBHI participation. The current review shows that while still a minority, studies with such characteristics is increasing. Eight of the 46 studies reviewed here use baseline and follow-up data and control for self-selection effects. Five of these studies are based on data from China (Yip et al., 2008; Zhang & Wang, 2008; Wagstaff et al., 2009; Chen and Yan, 2012; Xuemei and Xiao, 2011). While Lu et al. (2012) examine the effect of Rwanda's CBHI scheme, Levine et al. (2012) provide an assessment of a scheme in Cambodia and Parmar et al. (2012) examine a scheme in Burkina Faso.

## **6. Summary and conclusion**

A number of community-based health insurance schemes are operating in several low and middle-income countries. Such schemes may be thought of as a hybrid between traditional risk sharing and market based insurance arrangements. Matching the increased attention paid to such health financing arrangements as a policy option, empirical studies assessing the effects of such schemes have also proliferated.

The aim of this paper was to inform policy and research by providing a systematic review of the existing empirical evidence on the operation and effectiveness of such schemes with a focus on three outcomes – access to schemes, effect on health care utilization and effect on financial protection. In addition to summarizing the evidence, the paper analysed the link between key scheme design characteristics and their effect on outcomes and finally

commented on the quality of the empirical work. Our examination of the evidence yields a number of conclusions pertinent to both health policy makers and to researchers

Despite their avowed aim of social inclusion, the review shows that the ultra-poor do not have access to CBHI schemes. Even if they do enrol, the lowest income groups are less likely to use health care services perhaps due to their inability to bear other costs (transportation and opportunity) associated with accessing health care. There is also considerable evidence that individuals with pre-existing health conditions are more likely to enrol, which leads to concerns about the sustainability of such schemes. The bulk of the studies find that access to CBHI is associated with increased health care utilization, especially with regard to the use of relatively cheaper outpatient care services (4 to 10 percentage point increase) as opposed to inpatient care. The schemes also appear to be associated, in about half the schemes, with a reduction in OOP expenditure (12 to 35 percent). In short, there is evidence to back the claim that such schemes are responsible for enhancing access to health care services and providing a degree of financial protection. The more pertinent question is perhaps not whether such schemes work or not but whether there are specific scheme traits that are more conducive to generating desired outcomes.

A relatively novel aspect of this review has been an assessment of the link between scheme design characteristics and effectiveness. We found that top-down government-run schemes appear to be better in terms of ensuring health care access and reducing OOP expenditure as compared to community-run schemes. However, community-run schemes seem to be stronger in terms of reaching out to marginalized groups. Schemes that have access to external sources of financing, in addition to premiums, are more effective in providing financial protection and expanding access to healthcare services but not at reaching out to the ultra-poor. This pattern suggests that subsidies are more likely to flow to

the relatively better-off. A clear pattern, regardless of scheme type is that schemes where the community plays a role in scheme design and implementation are better at ensuring access to health care and financial protection – in turn, rather ironically, suggesting a greater need to bring in the community into scheme design and implementation.

Notwithstanding the relatively positive stylized facts emerging from the review, the quality of the underlying research base needs to be carefully considered. While there have been clear methodological improvements in the body of work as compared to Ekman (2004), the burden of proof needed to judge the effectiveness of an intervention has also risen. There are three key concerns. First, the bulk of the papers are based on a single period cross-section data set. While such studies are useful there is a clear need to analyse scheme performance over time. Such dynamic analyses are essential in order to assess the long-term feasibility of a community-based health financing approach. Second, while there is a greater recognition of the need to control for self-selection in scheme uptake and to account for the endogeneity between CBHI uptake and outcomes, the bulk of the papers (37 out of 43) on utilization continue to ignore selection effects, which raises doubts about their internal validity. Third, baseline and (repeated) follow-up data are needed in order to identify causal effects and at the moment a limited set of papers use such data in their assessments of the impact of CBHI schemes.

Notwithstanding the methodological concerns, given the consistency of the findings across the various papers at least with regard to health care utilization and financial protection, the accumulated evidence suggests that CBHI schemes play a limited but important role in ensuring greater access to health care and providing some measure of financial protection to a sub-set of workers in the rural and informal sector in developing countries.

However, from a methodological and more importantly from a policy perspective, future work needs to provide a more careful assessment of scheme design characteristics which impinge on scheme success and if possible, scheme roll-out and evaluation needs to be integrated so that baseline data and repeated follow-up data are readily available and may be used both to control for unobserved heterogeneity which may be driving scheme uptake and outcomes and to support longer-term analysis of such schemes. Increases in the quality of the evidence base are essential in order to provide a more credible data base on which to judge whether and what type of design features of community-based schemes offer a viable long-term health financing strategy.

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**Table 1: Features of different CBHI models**

<b>Type of CBHI</b>	<b>Design features</b>	<b>Management features</b>	<b>Organizational and institutional features</b>	<b>Role of government and NGOs</b>	<b>Role of the community</b>	<b>Strong side of the scheme</b>	<b>Weakness of the scheme</b>
<b>Community prepayment health organizations</b>	<p>Financed by contribution from members</p> <p>Small financial contribution mainly to cover primary health care services</p> <p>Membership is on a voluntary basis</p>	<p>Strong community involvement in decision making and supervision</p>	<p>The provider is not involved in the administration of the scheme</p> <p>The schemes may sign contractual agreement with local providers to obtain preferential prices and insure quality of services</p>	<p>NGOs often provide technical assistance and provide start-up funds</p> <p>Governments provide legal recognition and encourage their establishment</p>	<p>Pay premiums</p> <p>All round community involvement in design, implementation and supervision</p>	<p>Trust and feeling of ownership</p>	<p>Small size in nature and low ability to pool enough resources</p> <p>Lack of technical and managerial skills about health insurance administration</p>
<b>Provider based health insurance schemes</b>	<p>Designed by local health care providers (hospitals) to encourage service utilization</p> <p>Often cover expensive inpatient care</p> <p>Membership is on a voluntary basis</p>	<p>Providers involved in scheme management</p>	<p>Providers administer the schemes and collect premiums from</p> <p>Providers may obtain technical assistance from the government and NGOs.</p>	<p>NGOs and governments may improve the facility of the providers</p>	<p>Pay premiums</p> <p>Provide feedback on quality</p>	<p>Does not require management and technical skills from the community</p> <p>Scheme management and service provision are integrated</p>	<p>Limited scale</p> <p>Relatively low power of the community to influence benefit package and quality of care</p>

<b>Government-run community-involved health insurance</b>	Designed by governments as part of the health financing system  Often includes both primary care and hospitalization  Membership may be voluntary or mandatory	Schemes are organized and managed through a top-down approach by central and local governments but the community may also be involved in decision making processes	Government are strongly involved in the design, implementation, and evaluation of the scheme.	Government and NGOs may subsidise the scheme and provide exemption from premium payment for lower income groups	Pay premiums  Communities may be involved in design and administration of the schemes	The possibility of subsidized premiums  Large size of scheme and enhanced sustainability	Limited feeling of community-ownership  Potentially high administrative costs
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**Source:** Adapted from Jakab & Krishnan (2001), Arhin-Tenkorang (2001) and Ekman (2004)

**Table 2: List of papers included in the review**

Author(s)	Country	Scheme	Scheme Type <sup>14</sup>	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Aggarwal (2010)	India	Yeshasvini	Gov't	2007-08	3 million individuals	Social exclusion	Logit model	Richer groups were more likely to enrol	The study attempts to reduce selection bias but baseline differences between treatment and control groups are not controlled.
Atim (2000)	Ghana	Nkoranza community health insurance Scheme	Provider	1999	30% of population	Adverse selection	Simple descriptive	There is evidence for adverse selection	The study compares the socio-economic status of insured households.
Carrin et al. (1999)	China	RCMS	Gov't	1993 & 1995	31 to 100 % of pop.	OOP payment	Simple descriptive	Reduction in health care costs	The study collects baseline information but does not use it appropriately. The analysis on financial protection effect is based on descriptive analysis.
Chee et al. (2002)	Tanzania	Hanang district health fund	Gov't	2001	2.8% of households	Outpatient care	Simple descriptive	CBHI members more likely to use services	The results are based on healthcare service utilization data obtained from selected providers and the sample may not be representative.

<sup>14</sup> 'Scheme type' indicates whether the scheme is a community prepayment health organization (Com'ty); Health care provider initiated insurance scheme (Provider) or a Government-run community-involved health insurance scheme (Gov't).

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome Variable	Method of analysis	Findings	Remarks
Chen and Yan (2012)	China	URBMI	Gov't	2007 & 2008	n/a	Social exclusion	Random effects logit model	Sig. pos. effect	The results are based on longitudinal data which include baseline information
						Adverse selection	Random effects logit model	Sig. pos. effect	
Criel and Kegels (1997)	Congo	Bwamanda hospital health insurance	Provider	1986-1995	41% of the population	Inpatient care	Descriptive statistics	Sig. Pos. effect	Does not control for differences between the socio-economic and demographic characteristics of insured and uninsured groups.
Desmet (1999)	Bangladesh	Gonosasthya	Com'ty	1995	27.5% of households	Inpatient care	Simple descriptive	Insured households use more curative care than non-members	Data is from healthcare providers. Does not control for differences between the characteristics of insured and uninsured households.
						Outpatient care	Simple descriptive	Insured households use more hospitalization care than non-members	
		Grameen	Provider	1994	41%	Outpatient care	Simple descriptive	Insured households use more care than uninsured	

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Devadasan et al. (2007)	India	ACCORD	Provider	2003-04	35% of the population	Incidence of catastrophic OOP payment	Simple descriptive	Reduced from 8% to 3.5%.	The data were obtained from insurance claimants who were hospitalized during the study period. There is no control group.
		SEWA	Com'ty	2003-04	20% of the population	Incidence of catastrophic OOP payment	Simple descriptive	Reduced from 49% to 23%.	

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Diop et al. (2006)	Ghana	Nkoranza hospital insurance Scheme	Provider	2004	n/a	Social exclusion	Logit model	No effect	The study does not control for the endogeneity of scheme participation.
						Outpatient care	Logit model	Sig. pos. effect	
						Inpatient care	Logit model	No effect	
						OOP payment	Log-linear	No effect	
						Catastrophic OOP payment	Log-linear	Sig. neg. effect	
	Mali	Bla and Sikasso scheme	Com'ty	2004	3.3 to 11.4 % of the population	Social exclusion	Logit model	Sig. pos. effect	
						Adverse selection	Logit model	Sig. pos. effect	
						Outpatient care	logit model	Sig. pos. effect	
						OOP payment	Log-linear	No effect	
	Senegal	26 Mutual Health Organizations	Com'ty	2004	n/a	Social exclusion	Logit model	Sig. pos. effect	
						Adverse selection	Logit model	Sig. pos. effect	
						OOP payment	Log-linear	No effect	
						Catastrophic OOP payment	Log-linear	Sig. neg. effect	

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome Variable	Method of analysis	Findings	Remarks
Dror et al. (2009)	India	UpLift Health	Com'ty	2005	16,356 individuals	Social exclusion	Descriptive statistics	No effect	In addition to the household survey, the study collects and uses information by interviewing managers of the scheme. However, the study does not control for differences in socio-economic and other household characteristics between insured and uninsured households.
						Inpatient	Descriptive statistics	Sig. pos. effects	
		BAIF	Com'ty	2005	600 individuals	Social exclusion	Descriptive statistics	No effect	
						Inpatient	Descriptive statistics	Sig. pos. effects	
		Nidan	Com'ty	2005	10189 individuals	Social exclusion	Descriptive statistics	Non-insured people were wealthier than insured people	
						Inpatient	Descriptive statistics	Sig. pos. effects	

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Dror et al. (2005)	Philippines	Six micro health insurance units	n/a <sup>15</sup>	2002	n/a	Adverse selection	Simple descriptive	No evidence of adverse selection	The data has been collected through field surveys. Robustness of results has been examined. Evidence of selection bias, which is not controlled for.
						Inpatient care	Descriptive statistics	Sig. pos. effect	
Ekman (2007)	Zambia	Prepayment scheme	Gov't	1998	n/a	Catastrophic OOP payment	Logit model	Sig. increase in the risk of catastrophic payment <sup>16</sup>	In order to check the robustness of the finding, the study employs several sensitivity analysis for alternative definitions of the outcome variable and model specifications.
Franco et al. (2008)	Mali	Four mutual health organizations in Bla and Sikasso	Gov't	2003-04	3.3 to 11.4 % of the population	Social exclusion	Logit model	No effect	Does not control for selection bias.
						Outpatient care	Logit model	Sig pos. effect	
						OOP payment	OLS	Sig. neg. effect	
Galarrraga et al. (2010)	Mexico	Seguro Popular (SP)	Gov't	2006	44% of households	OOP Payment	Instrumental variables	Sig. neg. effect	The study applies instrumental variables techniques on cross sectional data to deal with endogeneity and self-selection problems in insurance enrollment decisions.

<sup>15</sup> There is no clear information on establishment and management of the schemes

<sup>16</sup> This result is obtained for a broader definition of health care spending (i.e., for both direct medical payments for health providers and indirect health related costs). In the case of a narrower definition of health care spending (i.e., only direct payments), the scheme reduces the risk of catastrophic expenditure.

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Gnawali et al. (2009)	Burkina Faso	Nouna CBI	Com'ty	2006	5.2 % of households	Social exclusion	Logit model	Sig. pos. effect	The study applies PSM on cross-section data. Does not control for unobserved differences between treatment and control.
						Outpatient care	PSM	Sig. pos. effect	
						Inpatient care	PSM	No effect	
Gobah and Liang (2011)	Ghana	ADMHIS	Gov't	2010	63.5 % of the population	Utilization	Descriptive statistics	Sig. pos. effect	Both quantitative and qualitative data used for analysis

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Gumber (2001)	India	SEWA	Com'ty	1998-99	63,000 individuals	Social exclusion	Multinomial logit	No effect	The study is based non- randomly selected data. In addition, it is not clear why the author uses multinomial logit model to examine the determinants of enrolment to SEWA scheme.
						Adverse selection	Multinomial logit	Mixed <sup>17</sup>	
						Outpatient Care	Multinomial logit	Sig. pos. effect	
						Inpatient Care	Multinomial logit	No effect	
						OOP payment	OLS	No effect	
		ESIS	Gov't	1998-99	n/a	Outpatient Care	Multinomial logit	No effect	
						Inpatient Care	Multinomial logit	Sig. pos. effect	
						OOP payment	OLS	Sig. neg. effect	
		Mediclaim	Com'ty	1998-99	n/a	Outpatient Care	Multinomial logit	No effect	
						Inpatient Care	Multinomial logit	No effect	
						OOP payment	OLS	Mixed <sup>18</sup>	

<sup>17</sup> No significant difference between members and non-members in terms of previous chronic illness or hospitalization history. However, married individuals, who expected need for maternal care are more likely to become members of the scheme.

<sup>18</sup> The Mediclaim insurance plan is associated with a significant increase in out-of-pocket payment for hospitalization care. However, the scheme does not significantly affect out-of-pocket payment for ambulatory (outpatient) care.

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Hamid et al. (2011)	Bangladesh	Grameen Bank	Provider	2006	n/a	Utilization	Probit model	Sig. pos. effect	The paper considers endogeneity and spill-over effects of the programme. However, lack of longitudinal data limits the ability of the paper to deal with such issues.
Ito and Kono (2010)	India	Yeshasvini	Gov't	2008	n/a	Adverse selection	Probit model	Mixed <sup>19</sup>	The study does not control for the quality and quantity of health care supply
Jowett et al. (2003)	Vietnam	Vietnam's voluntary insurance	Gov't	1999	20% of individuals	OOP payment	Heckman, OLS	Sig. neg. effect	The paper addresses scheme self-selection bias using cross-section data.
Jutting (2003)	Senegal	Les mutuelles de santé	Com'ty	2000	37.4 to 90.3% of households	Social exclusion	Probit Model	Sig. pos. effect	The study pays limited attention to potential bias due to unobservable factors that may drive scheme uptake.
Jutting (2004)	Senegal	Les mutuelles de santé	Com'ty	2000	30 000 individuals	OOP payment	Log-linear	Sig. neg. effect	The study emphasises endogeneity and self-selection issues.
						Inpatient care	Logit model	Sig. pos. effect	
Lammers and Warmerdam (2010)	Nigeria	Health Insurance Fund (HIF)	Com'ty	2008	6% of the population	Social exclusion	Logit Model	Sig. pos. effect	Based on cross-section data. Conducts a sensitivity analysis.
						Adverse selection	Logit model	Sig. pos. effect	
Levine et al. (2012)	Cambodia	SKY Health Insurance	Com'ty	2007-2008	n/a	Utilization	IV, ITT	Sig. pos. effect	Randomised control and use of longitudinal household data which includes baseline information
						OOP payment	IV, ITT	Sig. neg. effect	

<sup>19</sup> Households with a larger share of sick members are significantly more likely to join the scheme but households with sick household heads are less likely to apply for membership.

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Liu et al. (2012)	China	NCMS	Gov't	2006	85 to 91.3 % of the population	Outpatient care	Descriptive statistics	No effect	
						Inpatient care	Descriptive statistics	Sig. pos. effect	
	Vietnam	CHI, VHI	Gov't	2006	49.4 to 52.7 % of the population	Outpatient care	Descriptive statistics	Sig. pos. effect	
						Inpatient care	Descriptive statistics	Sig. pos. effect	
Lu et al. (2012)	Rwanda	Mutuelles	Gov't	2000-2008	More than 90% of the population	Utilization	Random effects logit model, IV	Sig. pos. effect	The authors use panel data for child and maternal care analysis. They use pooled data for general population medical care utilization and catastrophic health spending analysis. Matching is used to control for self-selection bias in insurance uptake and endogenous household expenditure while examining financial risk protection.
						Catastrophic OOP payment	IV, Logit model	Sig. neg. effect	
Msuya et al. (2007)	Tanzania	Igunga district health insurance fund	Gov't	2000	n/a	Social exclusion	Probit model	Sig. pos. effect	The conclusions are based on one regression per outcome variable. No sensitivity analysis. Does not deal with self-selection issues.
						Utilization	Probit model	Sig. pos. effect	
Nguyen et al. (2011)	Ghana	NHIS	Gov't	2007	45 % of the population	OOP payment	Two part model (Probit + log-linear)	Sig. neg. effect <sup>20</sup>	No attention is paid to self-selection bias in insurance uptake.
						Catastrophic OOP payment	Probit model	Sig. neg. effect	

<sup>20</sup> The effect of the scheme on OOP payment is only significant at 10 percent and the magnitude is small (reduction in health expenditure is equal to 1.25 percent of non-food household consumption).

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome Variable	Method of analysis	Findings	Remarks
Noterman et al. (1995)	De Congo	Masisi referral hospital	Provider	1987-1990	26.8% of the population	Inpatient care	Simple descriptive	Increase in hospital admission <sup>21</sup>	The study uses an experimental approach. However, the program was not implemented randomly across eligible households, there is evidence of adverse selection.
Onwujekwe et al. (2009)	Nigeria	Anambra state CBHIs	Gov't	n/a	n/a	Social exclusion	Descriptive statistics	No effect	The SES of the respondents is not properly defined.
Parmar et al. (2012)	Burkina Faso	Assurance maladie à base communautaire	Com'ty	2004-2007	n/a	Adverse selection	Fixed effects	Mixed <sup>22</sup>	The study uses panel data to examine adverse selection overtime.
Ranson (2002)	India	Women's Association's Medical Insurance Fund	Com'ty	1994-2000	23,214 individuals	Catastrophic OOP	Descriptive statistics	Reduced from 35.6 percent to 15.1 percent <sup>23</sup>	Paper is based on data from reimbursement claims submitted between 1994 and 2000.
Ranson et al. (2006)	India	Self-Employed Women's Association's (SEWA)	Com'ty	2003	103,000 individuals	Social exclusion	Simple descriptive	The scheme is inclusive <sup>24</sup> .	The study uses well-argued measures of socio economic status in order to see the impact of the schemes across different income groups. However, it does not deal with self-selection issues.

<sup>21</sup> Hospital admission among subscribers increased by 157 percent and among non-subscribers increased by 31 percent between 1987 to 1988, the first period of the prepayment experiment.

<sup>22</sup> Adverse selection is detected only in 2007 mainly due to a subsidy premium offered to poor households.

<sup>23</sup> The share of claimants for whom health expenditure would have been catastrophic (more than 10 percent of annual household income)

<sup>24</sup> 32 percent of rural members and 40 percent of urban members are from the bottom 30<sup>th</sup> percentile of socioeconomic status.

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome variable	Method of analysis	Findings	Remarks
Rao et al. (2009)	Afghanistan	Parwan and Saripul Community Health Funds	Gov't	2004 & 2006	1 to 38 % of households	Outpatient	Simple descriptive	CBHI members use more care <sup>25</sup>	This study uses longitudinal data with baseline information. However, the paper applies descriptive analysis and does not use the panel data to control for differences between control and treatment groups.
						OOP payment	Descriptive statistics	Increase in OOP payment <sup>26</sup>	
Robyn et al. (2011)	Burkina Faso	Nouna District CBHI scheme	Com'ty	2007	8.6% of the population	Utilization	PSM	Sig. pos. effect	Despite the lack of panel data, the paper tries to deal with selection on observables by minimizing differences between treatment and control groups.
Saksena et al. (2011)	Rwanda	Mutuelles	Gov't	2005-06	74% of the population	OOP payment	Ordered logit model	Sig neg. effect <sup>27</sup>	The results are based on cross sectional data and there is no sensitivity analysis. Paper checks for endogeneity of enrolment using a Durbin-Wu-Hausman test, which is unable to reject exogeneity of enrolment.
						Catastrophic OOP payment	Simple descriptive	Reduces the risk of catastrophic health expenditure <sup>28</sup>	
Schneider and Diop (2001)	Rwanda	Byumba, Kabgayi, and Kabutare prepayment plan pilot	Gov't	2000	6.1 to 10.6% of the population	Utilization	Logit model	Sig pos. effect	The paper does not pay attention to endogeneity of enrolment. A single regression is estimated for each outcome variable.
						OOP payment	Log-linear	Sig neg. effect	
Sekyi and Domanban (2012)	Ghana	NHIS	Gov't	2008	More than 42 % of the population	Outpatient care	Logit model	Sig. pos. effect	Only limited set of number of individual and household level controls.

<sup>25</sup> CBHI members utilization constitutes from 29 to 90 percent of the total curative care utilization

<sup>26</sup> After the introduction of community health fund, OOP payment generally increased in the intervention province

<sup>27</sup> Despite the model produces insignificant negative effect of the scheme to reduce out-of-pocket expenditure as the share of capacity-to-pay, the authors conclude that the scheme provides financial protection for members.

<sup>28</sup> The incidence of catastrophic OOP payment was about four times less among insured households as compared to uninsured households.

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome Variable	Method of analysis	Findings	Remarks
Senchanthixay (2005)	Lao	Sisattanak district CBHIs	Gov't	2004 & 2006	n/a	Outpatient care	Simple descriptive	Increase in outpatient visits by 52 percent	Simple mean comparisons (without any statistical test) are used. Does not control for difference in income and individual characteristics of insured and uninsured patients.
						Inpatient care	Simple descriptive	Decrease in inpatient admission by 3.5 percent	
Shimeles (2010)	Rwanda	Mutuelles	Gov't	2005-06	85 % of the population	Social exclusion	Probit model	Sig. pos. effect	Despite the lack of longitudinal data, a range of methods are applied and the robustness of the findings are tested using alternative parametric regressions and propensity score matching techniques.
						Utilization	PSM, probit model	Sig. pos. effect	
						Catastrophic OOP payment	PSM, probit model	Sig. neg. effect	
Sun et al. (2009)	China	Shandong province medical scheme	Gov't	2004	94.6% of the population	Catastrophic OOP payment	Simple descriptive	Decrease in catastrophic OOP payment	The study is based on comparing health expenditure before and after reimbursement of insurance claims without any control group.
Wagstaff et al. (2009)	China	NCMS	Gov't	2003 & 2005	406 million individuals	Outpatient care	DID with PSM	Sig. pos. effect	The study is based on household surveys before and after the intervention from treatment and control sites (counties). The study also uses health facility data. Exploiting the panel nature of the data, the study uses difference in difference with matching method to control for potential bias from observable covariates and unobservable time invariant confounders.
						OOP payment	DID with PSM	No effect <sup>29</sup>	

<sup>29</sup> This is for total out of pocket payment. The programme significantly reduces OOP payment for deliveries and increases expenditure for outpatient visits and inpatient care.

Author(s)	Country	Scheme	Scheme Type	Year of study	Scheme coverage	Outcome Variable	Method of analysis	Findings	Remarks
Wang et al. (2005)	China	Fengshan Township CBI	Gov't	2002	n/a	Social exclusion	Logit model and OLS	Sig. pos. effect	
						Adverse selection	Logit model and OLS	Sig. pos. effect	
Xuemei and Xiao (2011)	China	NCMS	Gov't	1991-2006	n/a	Utilization	Fixed effects, IV, Logit model	No effect <sup>30</sup>	This study uses six years of panel data, before and after NCMS implementation.
Yip et al. (2008)	China	Rural Mutual Health Care (RMCH)	Com'ty	2002&2005	60000 individuals	Outpatient care	DID, PSM	Sig. pos. effect	The paper uses appropriate methods and data from longitudinal household surveys canvassed before and after the intervention from both treatment and control groups.
						Inpatient care	DID, PSM	No effect	
Zhang and Wang (2008)	China	Fengsan Township CBHI scheme	Com'ty	2002 - 2006	n/a	Social exclusion	DID	Sig. pos. effect	The results are based on a 4-year longitudinal survey. Random effect logit models are used to control for potential sources of bias.

<sup>30</sup> The paper finds that enrollment in insurance does not increase either the probability of visiting doctors or utilization of preventive health services.

**Table 3: Effect of CBHI on outcomes**

Outcome	Schemes displaying an effect		
	%	N	Total
Utilization	74.3	26	35
Outpatient care	75.0	9	12
Inpatient care	64.3	9	14
OOP healthcare payment	56.3	9	16
Catastrophic OOP	85.7	6	7
Social exclusion	61.1	11	18
Adverse selection	66.7	6	9

**Notes:** Effect indicates whether the studies find (i) statistically significant and positive effects of CBHI schemes on utilization of health care (ii) statistically significant effects in terms of reducing OOP payment (iii) whether the poor are statistically less likely to access CBHI and (iv) whether those with existing ill-health conditions are statistically more likely to access CBHI.

**Table 4: The effect of scheme characteristics on outcomes**

	Scheme displaying an effect								
	Utilization			OOP Payment			Social Exclusion		
	%	N	Total	%	N	Total	%	N	Total
Scheme Type:									
Gov't	78.6	11	14	75.0	6	8	85.7	6	7
Community Provider	68.8	11	16	42.9	3	7	50.0	5	10
External fund <sup>a</sup>									
Support	81.0	17	21	66.7	6	9	63.6	7	11
No support	75.0	3	4	50.0	1	2	100	3	3
Contract with providers									
Signed agreement	82.6	19	23	63.6	7	11	63.6	7	11
No agreement	100	1	1	0.0	0	0	75.0	3	4
Community participation									
Part. in design <sup>b</sup>	100	9	9	80.0	4	5	75.0	3	4
Not part. in design	54.5	6	11	25.0	1	4	66.7	4	6
Part in implementation <sup>c</sup>	100	7	7	100	2	2	33.3	2	6
Not part. in implementation	64.3	9	14	28.6	2	7	66.7	6	9
Microfinance linked schemes <sup>d</sup>	83.3	5	6	50.0	1	2	0.0	0	4

**Notes:** <sup>a</sup>External fund indicates any financial support to the scheme from governments or any development organization in order to (partially) cover administrative costs or to provide subsidized premiums. <sup>b</sup> Participation in design stage indicates that the target population was given a chance to participate in the establishment of CBHI schemes. <sup>c</sup> Participation in implementation indicates that members of the community are involved in managing and supervising schemes. <sup>d</sup> Schemes that are linked to existing microfinance services.

**Table 5: Research methods**

Method	Utilization		OOP health expenditure		Social Exclusion		Adverse selection	
	%	N	%	N	%	N	%	N
DiD/ IV/Heckman <sup>a</sup>	14.0	6	29.4	5	10.5	2	27.2	3
Logit/ PSM/Probit/OLS <sup>b</sup>	44.2	19	58.8	10	63.2	12	54.5	6
Descriptive with statistical test	23.3	10	5.9	1	21.1	4	0.0	0
Descriptive without statistical test	18.6	8	5.9	1	5.3	1	18.2	2

**Notes:** <sup>a</sup> DiD-Difference-in-differences, IV - Instrumental variables; <sup>b</sup> PSM - Propensity score matching, OLS - Ordinary least squares.

**Table 6: Study characteristics and outcomes**  
(only studies that apply regression analysis)

Study characteristics	Utilization		OOP health expenditure		Social Exclusion		Adverse selection	
	%	N	%	N	%	N	%	N
Data type								
Cross-section	76.0	19	86.7	13	85.7	12	66.7	6
Panel	24.0	6	13.3	2	14.3	2	33.3	3
Baseline information	20.0	5	13.3	2	14.3	2	33.3	3

**Notes:** The following papers rely on panel data and baseline information to examine utilization, Yip et al. (2008), Levine et al. (2012), Lu et al. (2012), Wagstaff et al. (2009), and Xuemei and Xiao (2011); OOP health expenditure, Levine et al. (2012) and Wagstaff et al. (2009); Social exclusion, Zhang and Wang (2008) and Chen and Yan (2012); Adverse selection, Zhang and Wang (2008), Parmar et al. (2012), and Chen and Yan (2012).