# Impact of national health insurance for the poor and the informal sector in low- and middle-income countries



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July 2012

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## List of abbreviations

ATT             Average Treatment effect on the Treated
CACE            Complier Average Causal Effect
CBA             Controlled Before and After Study
CBHI            Community-based (Community) Health Insurance
CHF             Community Health Funds
CHI             Community Health Insurance
CHNS            China Health and Nutrition Survey
CHSI            Center for Health Statistics and Information
CMS             Cooperative Medical System
DFID            Department for International Development (UK)
DID             Difference in Difference
FE              Fixed Effects
GHIP            Guimaras Health Insurance Program
GSCF            Gansu Survey of Children and Families
H8BS            Health VIII Project Baseline Survey
HCFP            Health Care Fund for the Poor
HH              Households
HI              Health Insurance
HIP             Health Insurance Program
ILO             International Labour Organization
IMR             Infant Mortality Rate; Inverse Mills Ratio
ISED            Institute for Health and Development
ITT             Intention to Treat
IV              Instrumental Variable
LATE            Local Average Treatment Effect
LMIC            Low- and Middle-Income Countries
LSS/LSMS        Living Standard (Measurement) Survey
MOH             Ministry of Health
NCMS            New Cooperative Medical System/Scheme
NGO             Non-Governmental Organisation
NHIS            National Health Insurance Scheme
NHSS            National Health Service Survey
OECD            Organisation for Economic Development and Cooperation
OLS             Ordinary Least Square
OOP             Out-of-pocket
PHFI            Public Health Foundation of India
PHRplus         Partners for Health Reformplus
PSM             Propensity Score Matching
QIDS            Quality Improvement Demonstration Study
RCT             Randomised Controlled Trial
RDD             Regression Discontinuity Design
RMHC            Rural Mutual Health Care
SANCD           South Asia Network for Chronic Diseases
SES             Socio-economic Status
SHI             Social Health Insurance
SHIP            School Health Insurance Programme
SP              *Seguro Popular*
SSHI            Subsidised Social Health Insurance
VHCFP           Vietnam Health Care Fund for the Poor
VHLSS           Vietnam Household Living Standards Survey
VNHS            Vietnam National Health Survey
WHO             World Health Organization

# Abstract

**What do we want to know?**

Moving away from out-of-pocket (OOP) payments for healthcare at the time of use to prepayment through health insurance (HI) is an important step towards averting financial hardships associated with paying for health services. Social health insurance (SHI) is mandated for those employed in many developed countries where employment and wage rates are high; this service is extended to those unemployed through subsidy. In low- and middle-income countries (LMICs) some version of SHI has been offered to those in the informal labour sector, who may well comprise the majority of the workforce. We carried out a systematic review of studies reporting on the impact of health insurance schemes that are intended to benefit the poor, mostly employed in the informal sector, in LMICs at a national level, or have the potential to be scaled up to be delivered to a large population.

**Who wants to know and why?**

Our findings will help policy makers to learn what lessons the implementation of such insurance suggests in terms of welfare enhancement to those who currently undertake out-of-pocket health expenditure, which often exacerbates their already meagre material living conditions. The information in this document will help reshape existing programmes, and assess the need for expanding and introducing HI programmes for the poor and those in the informal sector. We further aim to influence future effort in examining the impact of health insurance by detailing appropriate methods that have succeeded in identifying the impact of insurance, given the mechanism through which schemes were offered.

**What did we find?**

Our systematic review showed inconclusive evidence. Low enrolment is commonly observed in many of the insurance schemes we examined. Many health system factors may play a role in explaining low enrolment; studies did not explore supply factors. We do not observe a pattern regarding enrolment and outcome: for example, high enrolment is not correlated with better outcomes. There is some evidence that health insurance may prevent high levels of expenditure. From those studies reporting on whether or not the impact on the subgroup of insured that were poorer was more noticeable, we find that the impact was smaller for the poorer population. That is, the insured poor may be undertaking higher OOP expenditure than those who are not insured.

**What are the implications?**

Greater effort needs to be undertaken to study the health-seeking behaviour of those insured and those uninsured in LMICs.

**How did we get these results?**

We give results from 34 studies that report the impact of health insurance for the poor using quantitative methods. We found no qualitative studies. We emphasise the results from those studies that made a significant effort to use statistical methods currently prevalent in the economics literature on impact evaluation.

**Where to find further information**

http://blogs.cgdev.org/globalhealth/2012/01/does-efficiency-matter-in-getting-to-universal-health-coverage.php

http://www.ilo.org/global/about-the-ilo/press-and-media-centre/news/WCMS_076899/lang--en/index.htm

# Executive summary

## Background

Several low- and middle-income countries have introduced some form of extension of state- sponsored insurance programmes to people in the informal sector in order to enhance access to healthcare and provide financial protection from the burden of illness. Social health insurance programmes are also of interest as a means of moving towards universal health care coverage in some countries. In parallel, there has been growing interest in evaluating the impact of health insurance programmes.

## Objective

Our objective is to systematically examine studies that show the impact of nationally or sub-nationally sponsored health insurance schemes on the poor and near poor. We use the general term social health insurance (SHI) if the insurance was nationally sponsored and operated at the national level, although this definition is not consistent with the general use of the term, referring to mandatory insurance enrolment for the formal sector. In developing countries, the poor work outside the formal sector and comprise a large portion of the population; thus, SHI, mandated within the formal sector, cannot subsidise the poor. Any state scheme where the risk pool consists of individuals across a province, state or nation qualifies to be called an SHI or an 'extended' SHI for this review. These schemes offer enrolment on a voluntary basis, free or at prices that are below the actuarially fair. Although in some ways these programmes may be considered revenue-financed purchasing arrangements, they intend to insure the poor against adverse effects arising from health crises. We examined studies reporting on schemes that meet all of the criteria below:

1. Schemes that seek to offer financial protection for people facing health shocks to cover health care costs involving some tax financing (or high rates of cross-subsidisation, which is unlikely) to keep premiums below actuarial costs on a sliding scale.
2. Schemes that have a component in which poorer households can or must enrol through some formal mechanism at a rate much below the actuarial cost of the package or even free of charge, and in return, receive a defined package of health care benefits.
3. These schemes may be offered in any one of the follow ways:
   a. nationally managed and may be seen as extension of existing SHI
   b. government (already or potentially) sponsored and managed at the community level (limiting the risk pooling population), either through a non-governmental organisation (NGO) or the local governmental unit. This is often called community-based health insurance (CBHI) or community health insurance (CHI).

We assessed the impact of social health insurance schemes on health care utilisation, health outcomes and healthcare payments among low- and middle-income people in developing country settings. We also examined insurance uptake.

## Methodology

We followed the Cochrane methodology of systematic review to the extent possible, and adapted the methodology to examine studies using more recent developments on impact evaluation in the economics literature.

1. Protocol: we devised a protocol in which the definitions, objectives, search strategy, inclusion and exclusion criteria, and data to be abstracted were all described. This protocol was peer reviewed and modified in the light of the comments received.

2. Literature search: all relevant studies, regardless of language or publication status (published, unpublished, in press and in progress), were sought. We searched a number of databases (including the Cochrane EPOC group Specialized Register, MEDLINE, EMBASE, ECONLIT, ISI Web of Knowledge, CAB Abstracts, CENTRAL, DARE and Economic Evaluation Database on The Cochrane Library, ELDIS and IDEAS) and other relevant sources (conference proceedings, website of several organisations including the World Bank, the World Health Organization and the International Labour Organization).

3. Selection criteria: studies were selected by two reviewers independently, according to predefined inclusion criteria. Further, in order to adjust for bias due to selection into insurance, as all insurance programmes were offered on a voluntary basis, only those studies that controlled for these potential selection problems were considered as fully valid studies.

4. Data collection and analysis: Using a standardised data extraction form, the relevant impact outcomes from the included studies were extracted. We report on enrolment rates to examine the acceptability of health insurance to those offered. The impact of insurance is reported in terms of changes in out-of-pocket healthcare expenditure, healthcare utilisation and, only in a few cases, health status.

**Results**

We found 34 studies reporting on the impact of health insurance through quantitative analyses. No qualitative studies reporting on impact were found. These 34 studies, conducted mainly within the past decade with insurance covering a variety of different populations, including children, market vendors and the general population, were included in our review. Most insurance schemes required no premium payment from beneficiaries but charge some co-payment at the point of use. Enrolment varied, from low in most cases (20-50 percent) to more complete (90 percent) in a few cases. Data were largely derived from national household surveys.

Of the 34 studies, 10 were methodologically weak, 5 were moderately strong, and 19 were methodologically strong. We assessed the validity of results from the studies according to study methods. Finally, the overall assessments of evidence come from the last of group of 19. Overall, the evidence on impact was limited in scope and questionable in quality. We found little evidence on the impact of social health insurance on changes in health status. There was some evidence that health insurance schemes increased healthcare utilisation in terms of outpatient visits and hospitalisation. Finally, there was weak evidence to show that health insurance reduced out-of-pocket health expenses; the effect for the poorest was weaker than for the near poor.

**Conclusion**

There is no strong evidence to support widespread scaling up of social health insurance schemes as a means of increasing financial protection from health shocks or of improving access to health care. The health insurance schemes must be designed to be more comprehensive in order to ensure that the beneficiaries attain desirable levels of healthcare utilisation and have higher financial protection. At

the same time, the non-financial barriers to access to healthcare, such as awareness and distance to healthcare facilities, must be minimised. Further, more rigorous evaluation studies on implementation and the impact of health insurance must be conducted to generate evidence for better-informed policy decisions, paying particular attention to study design, the quality of the data and the soundness of the econometric methods.

Key Terms: Selection Bias, Social Health Insurance, Systematic Review

# 1. Background

## 1.1. Introduction

Financial constraint is one of the major barriers of access to healthcare for marginalized sections of society in many countries (Garg and Karan 2009; Peters et al. 2002; Pradhan and Prescott 2002; Ranson 2002; Russell 2004; Wagstaff and van Doorslaer 2003; Xu et al. 2003). It has been estimated that a high proportion of the world's 1.3 billion poor have no access to health services simply because they cannot afford to pay at the time they need them (Dror and Preker *et al*. 2002. And many of those who do use services suffer financial hardship, or are even impoverished, because they have to pay (WHO 2010). For instance, around 5 percent of Latin American households spend 40 percent or more of 'non-subsistence income' on medical care each year (Xu *et al*. 2003). Of those households paying for hospitalisation care in India, 40 percent fall into poverty due to healthcare spending (Peters *et al*. 2002).

In a seminal empirical study, Robert Townsend (1994) showed that in rural India, health crisis in a household induced significant declines both in health and non-health consumption, a drop more severe than that associated with any other type of crisis. Townsend examined a household's ability to 'smooth consumption', i.e. the ability to maintain a stable level of consumption over a period of time. Health crises induce expenditure on health and may also induce declines in household income. The inability to smooth consumption over time due to a health crisis has been found in several other developing countries (Cohen and Sebstad 2003; Deaton 1997; Gertler and Gruber 2002; Wyszewianski 1986), defined here as low- and middle-income countries (LMICs) according to the World Bank classification (World Bank n.d.).

A study of 59 countries found lack of health insurance to be one of the main causes for catastrophic payments, defined as expenditure for health care exceeding some threshold proportion of an income measure (Xu *et al*. 2003 and Mahal *et al*. 2010). The threshold value can range from 5 to 40 percent (Pradhan and Prescott 2002; Ranson 2002; Russell 2004; Wagstaff and van Doorslaer 2003; WHO 2000).

Over the past decades, many LMICs have found it increasingly difficult to sustain sufficient financing for health care, particularly for the poor. As a result, international policy makers and other stakeholders have been recommending a range of suitable measures, including conditional cash transfers, cost-sharing arrangements and a variety of health insurance schemes, including social health insurance (SHI) (Ekman 2004; Lagarde and Palmer 2009). Moving away from out-of-pocket payments for healthcare at the time of use to prepayment (health insurance) is an important step towards averting the financial hardship associated with paying for health services (WHO 2010). In 2005, the World Health Organization (WHO) passed a resolution that social health insurance should be supported as one of the strategies used to mobilise more resources for health, for risk pooling, for increasing access to health care for the poor and for delivering quality health care in all its member states and especially in low income countries (WHO 2005), a strategy also supported by the World Bank (Hsiao and Shaw 2007).

## 1.2. Health insurance

Health insurance can be defined as a way to distribute the financial risk associated with the variation of individuals' health care expenditures by pooling costs over time through pre-payment and over people by risk pooling (OECD, 2004;).

If universal healthcare coverage is to be financed through insurance, the risk pool needs the following characteristics: i) compulsory contributions to the risk pool (otherwise the rich and healthy will opt out); ii) the risk pool has to have large numbers of people, as pools with a small number cannot spread risk sufficiently and are too small to handle large health costs; and iii) where there is large number of poor, pooled funds will generally be subsidised from government revenue (WHO 2010).

For classifying health insurance models, the OECD taxonomy (OECD 2004) uses four broad criteria: i) sources of financing; ii) level of compulsion of the scheme; iii) group or individual schemes; and iv) method of premium calculation in health insurance (i.e. the extent to which premiums may vary according to health risk, health status or health proxies, such as age). Based on the criteria of 'main source of financing', there are principally two types of health insurance: private and public. Both have further sub-classifications. According to this criterion, public schemes are those mainly financed through the tax system, including general taxation and mandatory payroll levies, and through income-related contributions to social security schemes. All other insurance schemes that are predominantly financed through private premiums can be defined as private.

## 1.3. Social health insurance and coverage for the poor

Social insurance seeks to remove financial barriers to receiving an acceptable level of health care and requires the healthy to share in the cost of care of the sick; the element of cross-subsidy is essential (Enthoven 1988). Yet, in reality, 'when a society considers providing for health care by offering health insurance, to some significant degree, at the public's expense, such insurance programmes provided through taxes or regulations are called social insurance programs' (Folland *et al*. 2004, p. 455; see also Carrin and James 2004; WHO 2010.

Social health insurance (SHI) differs from a tax-based system where the ministry of health (MoH), through general revenues, finances its own network of facilities which are paid for through a mixture of budgets and salaries (Wagstaff, 2007). Although some of the operating costs may come from earmarked tax revenues, SHI operates an institutional separation between the 'purchasers' of care from the providers of care with the beneficiaries having to enrol into the insurance system. The 'purchaser' can be an insurance agency which collects insurance funds while the provider can be the MoH, as in Vietnam, or the private sector, as in Argentina (Wagstaff, 2007). The payment for the service to the provider is conditional upon delivery of a service or through enrolment of recipients into a specific programme.

Historically, SHI originated as work-related insurance programmes in now-developed countries, and the coverage has been gradually expanded to the non-working parts of the population (Saltman et al. 2004). Social Health Insurance systems are generally characterised by independent or quasi-independent insurance funds, a reliance on mandatory earmarked payroll contributions (usually from individuals and employers) and a clear link between these contributions and the right to a defined package of health benefits (Gottret and Schieber 2006). SHI mandates enrolment for both those in the workplace and those outside it; various levels of subsidies for the population from different socio-economic levels are also provided.

SHI has also been mandated for formal-sector workers in a number of developing countries (Alkenbrack, 2008; Wagstaff, 2007). In order to achieve universal healthcare coverage, the institutional structure that emphasises payment to providers for services delivered has been offered to those beyond the formal workforce (Vietnam 1993 and 2003, Nigeria 1997, Tanzania 2001, Ghana 2005, India 2008, China 2003) as an alternative to direct tax-based financing of providers and out-of pocket payments. Where SHIs are present, the existing financing system may be used to offer insurance to the informal sector of the population at a rate of insurance premium adjusted for socio-economic status. Taking a few examples, the poor can be enrolled free on a voluntary basis in Mexico and Vietnam (Alkenbrack, 2008) or on a targeted basis at nearly no cost in Indonesia. In practice, it is often seen as an extension of SHI, at least administratively, where SHI is present in the formal sector; thus, Vietnam's Health Care Fund for the Poor (HCFP), introduced in 2003, uses general revenues to enrol the poor (and other underprivileged groups) in the country's SHI scheme (Wagstaff, 2010). The *Seguro Popular*, an insurance scheme introduced in Mexico with free enrolment for the poorest 20 percent (with a sliding-scale fee for voluntary enrolment for those above this level of economic status in the informal sector) is part of a larger reform known as the System of Social Protection in Health. The programme allows the enrolled poor to access health care free of charge from the *Seguro Popular*-sponsored health facilities network.

Schemes mentioned above for Indonesia, Mexico and Vietnam offer protection from health shocks. Thus, they insure households from financial crises that can be brought about through severe ill health. As stated earlier, where SHI are present in the formal sector, countries have seen coverage of the poor as an extension of SHI (Wagstaff *et al.*, 2009), although they usually offer a reduced benefit package in comparison to that received through SHI in the formal sector. Alternatively, they may be free-standing schemes (separate from an SHI) that offer financial protection to the poor through subsidised, usually voluntary household enrolment into a defined benefits arrangement (Anne Mills personal correspondence). We also note that at subsidised level, governments offer the poor or non-formal sector community-level risk-pooling mechanisms as an extension from SHI funding sources. Our central objective is to report on evaluations of these types of financial arrangements for the poor.

Given that most employment is informal in developing countries, governments are likely to manage compulsory insurance in the formal sector, with limited avenues to cross-subsidise the non-formal sector. Thus, the state is likely to offer insurance on a voluntary basis to the non-formal sector where the bulk of the poor work. Here, premiums would be considerably below the actuarially fair price. We will examine studies reporting on schemes that meet all of the following criteria:

1. Schemes that seek to offer financial protection for people facing health shocks to cover healthcare costs. These schemes involve some tax financing to keep premiums below actuarial costs on a sliding scale.
2. Schemes that have a component in which poorer households can or must enrol through some formal mechanism at a rate much below the actuarial cost of the package or even free of charge, and in return receive a defined package of healthcare benefits;
3. These schemes may be offered in any one of the follow ways:
a) nationally managed and may be seen as extension of existing SHI;
b) government (already or potentially) sponsored and managed at the community level (limiting the risk-pooling population), either through a non-governmental organisation (NGO) or the local governmental unit. This is often called community-based health insurance or CBHI.

## 1.4. Impact of health insurance and theory-based evaluation

The prime welfare objectives of social health insurance are to: i) prevent large out-of-pocket expenditure; ii) provide universal healthcare coverage; iii) increase appropriate utilisation of health services; and iv) improve health status (International Labour Office 2008; WHO 2010). Social health insurance can improve welfare through better health status and maintenance of non-health consumption goods by smoothing health expenditure over time and by preventing a decline in household labour supply (Townsend 1994). Insurance should at least allow those insured greater care with a reduced financial burden through risk sharing across people and across time to help smooth consumption for those who fall ill.

However, financial costs are only one of the potential barriers to access to health care; the severity of non-price barriers can also play a major role in LMICs, which results in variation of the impact of health insurance on healthcare utilisation for some population groups (Wagstaff 2009; Basinga et. al 2010; Toonen et. al 2009). For example, health insurance coverage may be of limited value to households living in remote areas where the roads linking them to health facilities are poor and transport options are limited; these physical disadvantages may be compounded by low levels of education and scepticism over the benefits of Western medicine (Wagstaff 2009). Even with insurance, barriers in accessing healthcare include: distance to the nearest healthcare facility; lack of knowledge, skills and capabilities in filling forms and filing claims, lack of money to pay initial registration fees; and indifferent attitudes of doctors related to actual and perceived quality of care (Sinha *et al*. 2006).

In order to measure the impact of SHI, one seeks to determine whether there is greater access to health care and a reduction in out-of-pocket expenditure. The welfare impact of social health insurance should be judged in terms of some measure of utilisation of health care for treatment, take-up of preventive care, avoidance of large one-off expenditures and improvement in health through being able to receive adequate care (Wagstaff 2010). The effects of different social health insurance schemes in low- and middle-income countries (LMICs) have been evaluated, (Gertler and Gruber 2002; GTZ *et al*. 2005; Hsiao and Shaw 2007), including randomised controlled trials that analyse specific effects of these schemes (De Allegri *et al*. 2008; King *et al*. 2007; Ranson *et al*. 2007). Some evidence of the positive impacts of health insurance was found.

In examining the evaluations of impact we adopt a theory-based evaluation approach. The ultimate impacts from insurance are, of course, good health and consumption smoothing through enabling a household to continue to supply an appropriate amount of labour due to good health, which would be financed without a large sudden increase in expenditure. Any insurance in order to do that must be taken up by households and utilisation of health facilities must take place. Figure 1.1 depicts a framework that would be required to fully explain the impact of insurance. The uptake of insurance or enrolment into insurance may depend on: how one perceives one's own risk; an understanding of the product; and social factors such as trust in financial institutions as one pays into a fund where services are delivered just in case some event occurs. The first column in Figure 1.1 depicts the offer of insurance and the consumer reaction. The second column indicates that the utilisation of health care may depend on fees charged at point of contact and guidance from the service provider. The third column indicates that proper health care delivered through insurance can improve health status, reduce out-of-pocket expenditure and limit the decline in labour productivity or supply. The two non-health outcomes make up consumption smoothing. Actual quality of care and

costs that are not covered through insurance determine the final outcomes. Enrolment is as much an impact as utilisation.

**Figure 1.1**: A theory of change due to health insurance
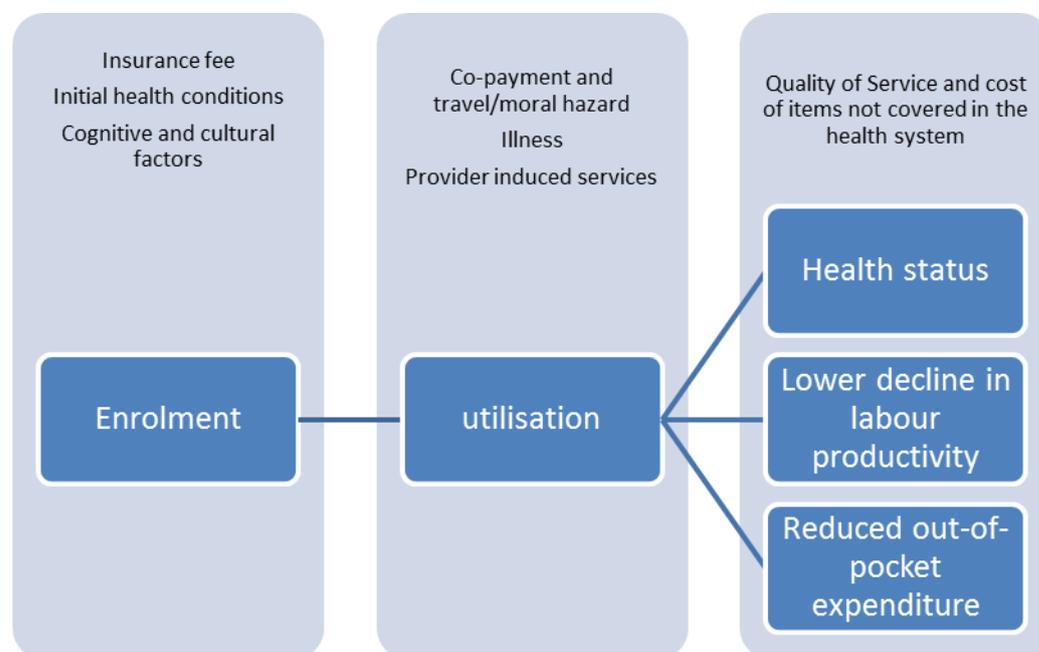


Note: Constructed from economic theory of insurance and health insurance; see Rothschild and Stiglitz (1976).

## 1.5. Existing systematic reviews

Because of the widespread interest in expanding health insurance coverage, there has been a parallel interest in evaluating the impact of health insurance programmes in terms of their effects on utilisation, out-of-pocket spending and health outcomes (Wagstaff 2009). However, despite support from international bodies, there has been no robust systematic review to date on the impact of SHI on the poor.

With regard to reviews in the literature, we located a number of related reviews on the sources of financing of insurance schemes world-wide (Ekman 2004; Fowler *et al*. 2010; Hanratty *et al*. 2007) and an unpublished paper not yet released that focuses on the review of risk-sharing schemes for health care (Lagarde and Palmer 2009) at the community level. Studies by Fowler (2010) and Hanratty (2007) pertain to developed countries.

Ekman (2004) focused on community-based health insurance in low-income countries. The author concluded that this provides some financial protection by reducing out-of-pocket spending. This review, however, did not consider whether the schemes protected households from catastrophic health expenditure or falling below the poverty line. Moreover, the review was limited to community health insurance schemes and the literature search was only up to 2003. Therefore, an update on the available literature would be beneficial.

The lack of systematic reviews may reflect the following: i) the scarcity of high-quality evaluations of insurance schemes; ii) the diversity of schemes, which prevents a coherent systematisation of results; and iii) the difficulty in finding all the relevant literature. A systematic review would provide robust evidence for policy makers and other stakeholders in developing countries to help them to understand the impact and relevance of social health insurance schemes.

## 1.6. Potential limitations: considerations in conducting a review of evaluation studies

It is difficult to evaluate the impact of insurance for a number of reasons. The next section of this report elaborates on the factors that make it challenging to assess the welfare implications of insurance. Challenges succinctly understood are the following: Firstly, as there is no automatic enrolment into insurance under extended SHI, problems stemming from adverse selection and possibly cream scheming may arise. Secondly, there is considerably difficulty in measuring welfare. This stems from problems arising from: understanding of risk and insurance, moral hazard[1] in terms of both utilisation and provision of healthcare and, lastly, increased health expenditure in the current setting may not be easily interpretable.

We also note that there are a number of factors that complicate the comparison of studies:

1.  There may be heterogeneity in the organisation of SHI schemes across and within countries;

2.  Outcomes may be conceptually similar but (a) time units for these measurements differ among studies and (b) are measured in different ways.

3.  Many results are based on statistical specifications that are unique to the study.

These factors lead us to report results as trends that do not represent any averaged effects.

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[1] Moral hazard is defined in Appendix 2.1

## 2. Health insurance: theory and empirics

Markets involving medical care and health insurance are fraught with information problems. This section examines important theoretical aspects of insurance and follows up with a note on estimation problems, which are elaborated as needed in the subsequent section.

### 2.1. Theoretical issues

We identified two key theoretical issues that affect the market for health insurance and subsequently affect measurement of the impact outcomes of SHI: selection problems – adverse selection and cream selection; and over-utilisation due to moral hazard – demand-induced and supplier-induced moral hazard (World Bank 1993). These problems stem from different parties having information that can be manipulated to their advantage.

The theoretical problems are detailed in Appendix 2.1. Here, we briefly touch upon the problem of selection into insurance when it is offered voluntarily, as perhaps this is the most relevant theoretical aspect of insurance for our study. As will be noted below, all insurance schemes offered to the poor in our study are offered on a voluntary basis. Appendix 2.1 offers a detailed discussion of theoretical issues regarding the voluntary uptake of health insurance as the problem of adverse selection; here, we point out that this aspect affects the type of studies that are relevant for examination.

Most health insurance schemes are offered to a group of individuals on a mandatory basis. This is because the voluntary offering of insurance may result in a preponderance of high-risk individuals who 'self-select', limiting risk pooling. When health insurance is offered to potential beneficiaries on a voluntary basis, it is likely that they have exclusive information regarding their own individual risk of falling ill. If such information were available from all potential beneficiaries, then the insurer could offer varied prices to match this risk. However, since such information is not available, all potential beneficiaries are often offered a single price. Thus, usually when health insurance is offered on a voluntary basis at almost any price, those who insure themselves may face higher risks of getting ill than those who do not insure themselves for that price. As a result, those who insure themselves are fundamentally different from those who do not when both are offered the insurance. Such unobserved heterogeneity between the insured and the non-insured dictates how the impact of insurance is measured empirically.

### 2.2. Empirical factors

In developing countries, health insurance has been offered to the poor where enrolment into insurance is voluntary. In many cases, extension of the mandated SHI from the formal sector is made to cover the non-formal sector and, at a subsidised rate, the poor. In Table 4.2 of Chapter 4 we describe the insurance schemes that we found from our research.

Although there are a myriad of outcome measures that follow from the theory of health insurance, the studies that we uncovered mostly revolved around insurance offering financial protection and measurement of utilisation without regard to moral hazard. Our discussion of outcomes closely follows the outcomes examined in our studies. Inasmuch as healthcare utilisation improves health status it is arguable whether insurance improves health status or not. We have found few cases that report changes in health status that can be attributed to the take-up of health insurance.

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As we noted, a key challenge to voluntary health insurance is adverse selection. In a voluntary insurance scheme, those who sign up are fundamentally different from those who do not. Any explanation of the determinants of outcomes must take into account selection into insurance. Our inclusion criteria for the review are based on this crucial factor. Estimating the impact of insurance involves the question: after controlling for selection, does insurance yield a better outcome for the insured in terms of healthcare usage, health status and financial protection? We note that in order for insurance to have an overall population impact, the insurance must be popularly accepted; thus, enrolment into health insurance is a factor we examine.

The impact measures can be divided into two types: intention to treat (ITT) effect and average treatment effect on the treated (ATT) (Khandker *et al.*, 2010). ITT is an indicator of the impact on all those who may have been offered a programme, such as health insurance (HI), but may or may not have participated in the project. Thus if HI is offered in a village, the impact of HI is roughly the difference in some outcome measure averaged for everyone in the village, minus the corresponding outcome measure averaged over everyone in villages without insurance; it is hoped that villages are similar in some relevant factors. ATT only focuses on those who took up the insurance in comparison to those who did not. Preferably, the comparison is made with those who have not been offered the insurance at all. Policy makers may well be interested in ITT if they want to know how successful their scheme was in offering the programme, which would critically depend on the enrolment rate. This offers little information on the actual impact on the insured. ATT takes into account selection effects and is the outcome of interest if we want to know the impact of the insurance programme on those who are insured. The enrolment rate implicitly offers a measure of implementation. We believe ATT and enrolment are key factors of interest to policy makers. When uptake is high, ITT may be of interest.

This section is divided into two sub-sections: Section 2.2.1 describes different outcome measures and their usage in measuring the impact of insurance; Section 2.2.2 discusses the estimation methods used to measure impact. Many of the details on the estimation methods appear in Appendix 2.1.

### 2.2.1. Outcome

We note three types of dependent or outcome variables that can be used to measure the impact of insurance: utilisation of health care; ability to reduce financial risk through reducing healthcare expenditure, and health status (Wagstaff, 2010). When a significant barrier to the use of health care is financial, HI allows individuals to spread the cost of health across all those insured at a given time and across time. Thus, individuals use health care more often and at lower costs. These measures are described below.

*Enrolment rate:* Even if the insurance is offered at no cost, enrolment may still be an issue (Wagstaff, 2007). Enrolment rates vary by location and programmes; the take-up depends on income, previous sicknesses, campaigns around insurance, perception of quality of care associated with insurance, and sometime even ethnicity. Determinants of enrolment for insurance carry important lessons for future policy (Gine and Yang 2007).

*Utilisation measures:* The use of healthcare facilities within a certain period is a common utilisation measure. The most pervasive measures of utilisation rates are inpatient and outpatient care at a specified time. Where applicable, the health facilities are divided into public and private sector. Another type of utilisation used in the studies is length of hospital stay. This could be an indicator of cost of care, severity of illness and the presence of moral hazard.

A justification for using different types of utilisation measures at facility level is that insurance may induce the use of more expensive services. For example, because private care may be more expensive, those insured may choose to use private care instead of public care (Yip and Berman 2001). In absence of the public/private dichotomy, it could be that analogously different levels of government care are accessed. Inpatient care can be accessed more often than outpatient care among the insured, as indicated in the moral hazard discussion in Appendix 2.1. Such substitutions may lead the insured to incur greater costs than the uninsured both terms of their own out-of-pocket expenditure and for the health system (Yip and Berman, 2001).

*Measuring financial protection*: The primary aim of nearly all insurance is protection from large financial losses. After enabling people to utilise health care, health insurance should reduce health expenditure. Ideally, in order to examine financial protection, one would want to examine whether or not consumption smoothing occurs in the long or medium term, and further, whether consumption levels change in the same way as they do for people with the same socio-economic status (Deaton 1997; Townsend 1994). Recent literature suggests that short-run consumption-smoothing strategies may carry adverse long-run consequences (Chetty and Looney 2006). Health insurance, together with a very good health system, should provide protection from large one-off health expenditures and reduce the impact on the workforce due to ill health. However, the main indicator used is much too narrow and is measured in a fairly short-run period. This measure, out-of-pocket expenditures or payments (OOPs), is a standard measure of the financial burden of seeking health care and is measured over a period of a year or less.

A dichotomous measure associated with the level of OOP relative to some measure of income is known as 'catastrophic payment'. These measures vary in our studies; many report measures of 40 percent or 30 percent of 'capacity to pay' without defining this. The numerator is as varied as the proportion itself, made up of 'post-subsistence income', including all expenditure minus health or income. Also, income measures are notoriously error prone when collected in developing countries (Deaton 1997). Income itself in a period of sickness may be affected greatly by the illness itself; expenditure may be a better numerator which may be more stable for the well-off, although not the poor. Given the myriad of definitions and loss of information on such a measure, it is doubtful that this is useful for determining the impact of health insurance. One study reported a measure of impoverishment defined as health expenditure inducing households into an income level below the poverty line over the last twelve months. Although a meaningful measure even if infrequently reported, it is not clear what type of welfare assessment this carries, as it ignores those already below poverty and falling much below their usual low level of wealth. A measure that may carry a clearer welfare implication is how much those below poverty have spent on health care.

*Measuring health status*: No particular patterns emerge as to how health status is measured in the health insurance literature. Some health status measures are self-reported. In addition, the unit of measurement roughly measuring the same relevant feature of insurance impact is not the same across studies; for example, in our review, we find that utilisation is measured for three months or even for one year. These different units are among the reasons that comparison of results is difficult.

## 2.2.2. Estimation methods

An account of the impact of an HI programme should include the enrolment rate. It should further show the differences in the healthcare utilisation rate among the insured in comparison to the uninsured. Similarly, the differences in some measure around OOP expenditure should be reported. The explanation of estimations can be technical; for that reason, the interested reader should turn to Appendix 2.1, section A2.3. In this section, we examine in detail issues around selection into insurance, as that determines what studies should be included in the review, although the inclusion criteria were relaxed to include more studies.

The statistical identification problem: a better interpretation of the measurement of the impact of insurance on utilisation of and expenditure on health care can be derived if these outcomes are compared between people who are more or less similar, but who only differ on whether or not they have had the insurance offered to them. As we indicated, it is possible that people who insure themselves against illness are fundamentally different from those who do not. Thus, selection into insurance must be taken into account if we want to measure the impact of insurance uptake on people. It must be noted that simple regression methods can capture what factors affect the uptake of insurance; however, the impact of insurance once taken up requires deeper examination of selection issues. Selection into insurance is the root of identification criteria. If, of course, there is universal take-up, then there is no selection effect. Statistical identification (or identification for short) issues revolve around ensuring that the estimator reports the effect of the variable it purports to report and not the effect of some other variable, observable or unobservable, that may shape the outcome through the variable of interest. In this way the link between a particular explanatory factor is identified with an outcome of interest. Identification problems can stem from two-way causality (endogeneity) or selection; in these instances, standard linear and non-linear regression methods produce spurious correlations. There is likely to be unobserved heterogeneity between those taking up insurance and those who do not; heterogeneity may also influence outcomes that can be attributed to the take-up insurance. This is the selection effect. In recent years, there has been considerable effort made in order to correct for selection bias when measuring the impact of inclusion into a programme (Imbens and Wooldridge 2009). Inclusion of studies in our review incorporated the identification criteria. Studies meeting the inclusion criteria stated below would have recognised the identification issue, although they may not have corrected for it properly.

There are standard ways through which statistical identification issues are addressed in empirical economics. With regard to insurance, the identification criteria are the following as it relates to this review:

1. Uptake of the insurance is voluntary. Insurance is offered to groups or individuals that are randomised but not everyone takes up the insurance; one of these method should be carried out:

   - Selection into insurance is taken into account through local average treatment effect estimation method (Angrist *et al*. 1996).

   - Those selected from the group offered the insurance are matched, through a propensity score matching method or some other method, with those who did not take up the insurance.

2. Insurance is implemented through a non-randomised method. Any one of the following should be carried out:

- Selection into the programme should be adjusted through instrumental variables, if possible. The instruments must meet statistical exclusion criteria explicitly verified either through statistical methods or demonstrably exogenous to any of the outcomes for theoretical reasons (Woolridge 2002). Non-selection should be taken into account as well (Maddala 1983).

- Those selecting the programme must be matched to a group that did not take up the insurance through propensity score matching.

- Either of the above techniques is used with a panel data set where at least one of the time measures comes from a period in which insurance is not in place.

3. If insurance is available at a particular place and other places do not have insurance, and the insurance is voluntary, then propensity score matching can be used to match individual takers with individuals from non-programme areas no matter what the rate of uptake is or whether or not the insurance is mandated.

4. It is possible that the poor are targeted and offered insurance nearly free of cost, with provider payments based on third parties paying fees for service, or capitation rates per contact. In this case, everyone is enrolled by a system that reaches out to all those eligible without any systematic omissions. There can be two sources of selection and the corresponding corrections are the following:

- Propensity score matching can be used to match regions by specific characteristics if there is regional placement bias.

- It is possible even in this targeted mechanism that there is individual selection into insurance; in this case, propensity score matching can be used at the individual level as in 3.

If insurance is offered to a targeted population, then ITT effects can be calculated through the regression discontinuity (RDD) method. If the uptake is low, then this method is likely to underestimate the impact of insurance on those who actually took up the insurance. RDD method examines an outcome of interest by comparing the outcomes for those eligible at the margin with those ineligible just at the margin.

# 3. Methodology

This section describes the search method, the inclusion criteria, data extraction, the method of summarising the data and the method of classifying the studies.

## 3.1. Search strategy and its result

We attempted to identify all relevant studies regardless of language or publication status (published, unpublished, in press and in progress). The computer search strategies are listed in Appendix 3.1.

### 3.1.1 Electronic searches

We searched the Cochrane EPOC group Specialized Register, MEDLINE (1950 to July 2010), EMBASE (1980 to July 2010), ECONLIT (1969 to July 2010), ISI Web of Knowledge (including Science and Social Science Citations Indices and Conference Proceedings to July 2010), CAB Abstracts (1973 to July 2010), CENTRAL, DARE and the Economic Evaluation Database (EED) on The Cochrane Library (Issue 3, 2010). ELDIS and IDEAS were searched in July 2010 to identify studies published from when health insurance schemes were being introduced to LMIC. The terms used for electronic searches were social health insurance, health financing in developing countries, health insurance in developing countries and single payer system.

### 3.1.2 Searching other resources

During the search process, we also searched the web sites of the World Bank, the World Health Organization WHOLIS database, USAID, the Inter-American Development Bank, the Asian Development Bank, the Global Development Network, the OECD, the National Bureau of Economic Research (NBER), the RAND Corporation and McMaster University Health Systems Evidence. The conference databases searched are listed in Appendix 3.1.

A few items were secured through citations found in articles and discussions with experts in this area. Total articles that were reviewed numbered at 34; six were added to the 28 found through original search.

The searches resulted in 4,759 hits; 1,062 duplicates were removed, leaving 3,697 records. Figure 3.1 illustrates the further screening and selection of studies carried out for exclusion and inclusion.

**Figure 3.1:** Flow diagram for relevant studies on the impact of social health insurance
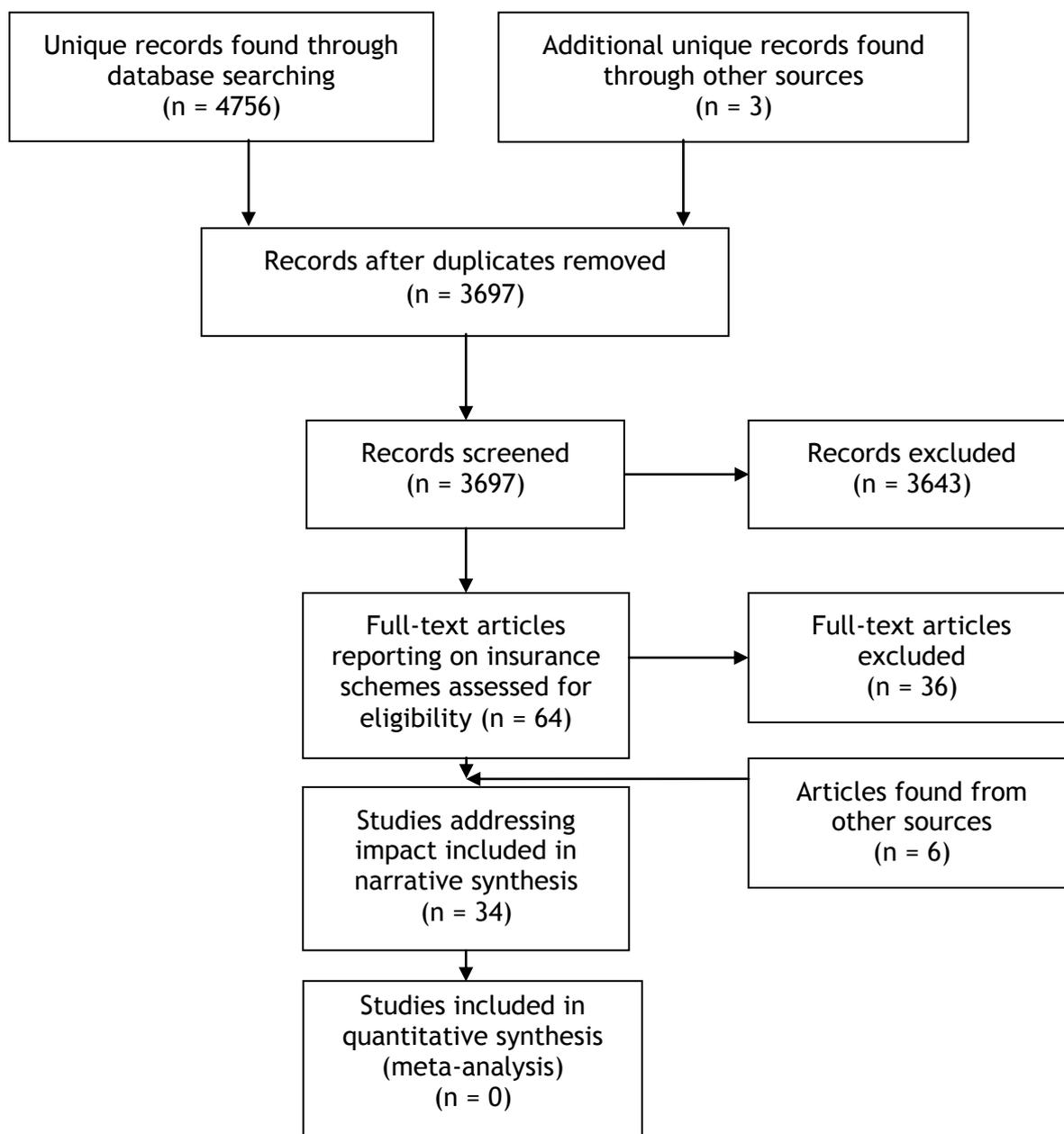
## 3.2. Inclusion criteria

The initial stipulation was that studies must report on programmes that could be seen as an extension of the social security system or SHI within LMICs; however, we found that some government programmes were encouraging Community-based Health Insurance (CBHI). CBHI studies were included if: i) they were government sponsored and were to be implemented comprehensively; ii) they offered methodology that was illustrative of the study type inclusion criteria stated below; or iii) they carried important messages on HI. We have included some CBHI studies that meet neither of these criteria to contrast the overall results between SHI and CBHI. The paper must have aimed to measure the impact of the insurance.

Studies had to report on any of the three types of impacts likely to be affected by those taking up insurance: accessing or utilising health care, healthcare expenditure or health status. Utilisation is included as barriers to accessing care are widespread in LMICs. We further examine enrolment: the theory-based framework suggests that low uptake could mean that HI may not easily be accepted by intended beneficiaries.

There were two distinct general methodological criteria for inclusion: i) the design of the study must have a comparison group against which the insured group can be measured; and ii) the study must examine the comparability of the groups or make adjustments through estimation methods which ensure that statistical identification criteria are met. When papers meet the inclusion criteria listed below they recognise the identification problem peculiar to insurance issues. However, the method for correction of the problem may not always be correct.

Ideally, all studies included in the systematic review should meet both the study design criteria and the identification criteria. However, as we found many studies that did not recognise the identification problem, we have included studies that either did not meet the identification conditions or loosely met them. Such a strategy has been used in a systematic review by Waddington *et al.*(2009), where they noted that sanitation programmes did not take into account placement selection. We did not find any guidelines on inclusion or methods for assessment of non-experimental studies in systematic reviews.

Our initial inclusion criteria were:

- Randomised controlled (field) trials (RCTs);

- Quasi-randomised controlled trials where methods of allocating are not random, but are intended to produce similar groupings of treatment and control; e.g., methods include:

    - propensity score matching methods

    - regression discontinuity design

- Controlled before and after studies (CBA) or difference in difference (DID) studies; if the pre- and post-intervention periods for the study and control groups are the same and the controls are matched

- Regression studies where probability of selection into treatment is taken into account through instrumental variables

- Qualitative studies focused on exploring the impact of SHI and meeting a checklist.

Papers that presented analysis by carrying out straightforward regression (ordinary least square, logistic and probit) without explicitly taking into account selection were included in the study, but were considered not to have addressed the

identification issues properly due to omitted variable bias through unobserved factors that affect both uptake of the insurance and outcomes. The original inclusion criteria were changed to include a larger number of studies. With the exception of RCTs, all of the above stated criteria yield properly identified estimation. In order for RCTs to take selection into account, they need to consider that even within the RCT design, those insured choose to become insured. We have not included any qualitative studies in this review, as we did not find any that met our criteria of explaining impact.

### 3.3. Data extraction

All the search results were independently screened by a two reviewers. Using a standardised data extraction form (see Appendix 3.2), we extracted the following information from the included studies:

• type of study (experimental and observational);

• characteristics of participants;

• study setting (country, characteristics of health insurance programme, other health financing options in place);

• main outcome measures (both primary and secondary) and results;

• threats to the validity of the studies in terms of treatment of adverse selection, utilisation of healthcare due to moral hazard, sample size calculation;

• quality assessment of studies (separately for quantitative and qualitative studies).

### 3.4. Summarising the data

It is difficult, and more importantly, misleading, to aggregate the outcome measures we found for three reasons: i) many of the outcome measures were different; ii) insurance schemes were broadly different and they even changed in the course of a study; iii) the estimations of the impact depended on functional forms and the unit of measurement. Usually the functional or parametric forms for estimating the impact of insurance were similar in the types of independent variables chosen, although income stratifications differed in such controls as regional dummies or distance to health centre. The measures of the dependent variables could vary widely, as studies could have different measures for the same type of dependent variables. For example, some studies used as the dependent variable for utilisation rate whether or not health facilities were used or how many times they were used in a given period, which usually differed. That the choice of the period under consideration can change results dramatically has been reported for healthcare expenditure (Das *et al*. 2011). Similar differences for OOP expenditure were also found. A few studies used outcome measures for only those who were ill. Thus, for these reasons, only trends are reported. In addition, magnitudes when reported, should be understood within the context of the study and have limited implications for generalisability outside the study even for the same insurance scheme within the same region.

### 3.5. Classifying the studies

We classified studies according to whether they reported on SHI or CBHIs, and further, according to the extent to which they met the identification criteria fully, moderately or not at all. This type of approach was undertaken because selection criteria were not strictly followed. If studies met the identification criteria through using a method described in section 2.2.2, this showed that it was trying to correct for selection through recognised or well-argued methods of correction. If a study

recognised the selection problem and went on to describe a method that was not standard methodology or a convincing argument for correction, we marked it as moderately meeting the identification criteria. If the study simply carried out a regression or presented non-parametric results, even if it mentioned the selection problem, it was marked as not meeting the identification criteria. In the next section, we report on study assessment. The threats to validity can be understood through the identification criteria.

Some studies used data that might not be the best that could have been collected. We have judged them according to whether or not they reported figures for those lost to follow up on panel data. If randomised, we considered whether they reported on loss to follow up after the baseline.

# 4. Findings: descriptions of the studies

We included 34 studies which reported on the impact of health insurance schemes for the poor using quantitative techniques: 25 reported on SHI and nine reported on CBHIs. We found no qualitative studies. In this section, we provide a classification of the studies on how well they met the identification criteria, descriptions of HI found in the studies and the corresponding data used, and the quality of the studies. In classifying the studies, we examined the strength of the evidence found through assessing the proper use of econometric techniques. As part of our assessment, we also noted the quality of the data and the source of funding for the studies.

## 4.1. Studies included, quality and classification

The studies can be classified according to Table 4.1. A natural division of studies is, of course, by type of insurance: whether a study reported on SHI or CHI. We further note that some studies included did not meet the inclusion criteria but were included simply because they examined the impact of SHI or CHI in developing countries; and further some meeting the inclusion criteria did not address identification issues properly. The classification of studies reflects these concerns. The classification does not take into account data quality and is based on identification criteria that take selection into account. We classified those meeting our 'identification criteria fully' as strongly meeting identification criteria; those that specified the selection problem and used a method unsuccessfully for correction as moderately meeting the identification criteria. Finally, although not initially specified to be included, those that did not use any correction for selection issues were considered as not meeting identification criteria.

**Table 4.1:** Studies by identification criteria (by type of study and insurance)

|  | Not meeting criteria | Partially meeting criteria | Strongly meeting criteria | Total (CHI/SHI) |
|---|---|---|---|---|
| Community health insurance | 5 | 1 | 3 | 9 |
| Social health insurance | 5 | 4 | 16 | 25 |
| Total | 10 | 5 | 19 | 34 |

Thus, only 16 studies fully met our identification criteria and reported on SHIs and only 3 CBHI study fully met the identification conditions. Thus, 19 studies met the conditions fully stated in the protocol as the strict inclusion criteria and further treated identification issues properly. An additional 5 studies met the inclusion criteria but did not treat identification issues properly, although they recognised this issue. The studies that either treated the identification criteria fully or moderately are assessed in Table 4.3; 24 studies are assessed. Studies which did not try at all to meet the identification criteria, numbering 10, are summarised and are labelled as not meeting identification conditions. This table also includes an assessment of the data used.

Only four studies reported from randomised experiments. One of them (Gnawali *et al*. 2009) took selection into account, but it is too small to have yielded much information. In another, very little information is offered in explaining its randomised assignment and the outcome of interest falls slightly outside other papers (Kraft *et al*. 2009). The study does not take selection into account. Two of the randomised studies (King *et al*. 2009; Thornton and Field 2010) met the complete identification criteria. King *et al*. is especially noteworthy for its design. It is a large study where regions are first matched by relevant health system factors, and then randomised assignment preserves this matching. The treatment for the regions was an information campaign for the Mexico's *Seguro Popular* de Salud insurance (SP).

The conclusions from Table 4.3 are:

- The ATT effect of insurance cannot be derived from randomised trials without taking into account that the number of people who take up insurance may be very low. Thus anyone taking up insurance is likely to be different from those not taking it (Gnawali *et al*. 2009; King *et al*.2009; Thornton and Field 2010). This type of selection must be corrected for.

- If insurance is offered in a given area and not in others, the matched group should be from those that were never offered the insurance (Wagstaff 2009).

- Selection into insurance should be theory based; and in the case of the use of instrumental exclusion variables (those variables explaining selection but not correlated with the main outcome of interest), this should be made explicit and tested.

- A Heckman selection model through inverse Mills ratio should incorporate both selection and non-selection (Maddala 1983).

### 4.2. Description of the insurance and data

SHI Studies were found from Georgia, Nicaragua, Colombia, Mexico, Costa Rica, the Philippines, Ghana, Egypt, China and Vietnam. For Vietnam and China, there were multiple studies and each had two insurance schemes evaluated. Reporting on the same insurance schemes from the respective studies, we found two studies from Colombia and three from Mexico. We found two studies from India, where government sponsorship or support was lent to non-profit community insurance. A similar study reported from the Philippines. CBHI studies without government support reported from Senegal, Burkina Faso and two states of India. As far as we can tell, only the Vietnamese insurance was completely free. The one in Indonesia had low entry costs. All insurance had some type of capitation and a well-defined set of services. The one in Egypt for children was comprehensive. Some studies reported a ceiling and some did not have any report on such conditions. In 2005, Indonesia extended its SHI to the poor where they were targeted to be enrolled for certain insurance. This was the only targeted insurance we report. We found a working paper (Shimeles 2010) on the well-known *Mutuelles* CBHI scheme from Rwanda with a nationwide uptake of 85 percent in 2008. The paper seemed to be at an early stage without clear definitions of outcome variables and descriptions of the data used. Thus, it is not included in our summary. A study reporting on slightly different impact, mainly on equity, from *Mutuelles* was found in Schneider and Hanson (2006).

Data quality and reporting varied. We can divide the data found into the following categories: i) data from a randomised study where it was specifically collected for the study; ii) data collection for specific ongoing insurance, mostly to examine the impact of the insurance; iii) data collected for a general well-being measure in a

country. The data sources within the studies are described in Table 4.2 along with descriptions of the insurance. Table 4.2 separates insurance schemes by separating them into CHIs or SHIs.

For the study using randomised designs, few reported loss to follow up, and none of the studies followed up on attrition. Living Standard Surveys (LSS), made suitable for the country and validated, present panel information of same households as part of their regular activities[2] and do not usually report loss to follow-up. In social experiments or surveys specifically designed to determine the impact of programmes such as health insurance, we are unlikely to find survey enumerators that are blind to knowledge regarding the insurance status of the interviewee. Assessments of data as they might affect the estimations are presented in Table 4.3. Only those studies that met the inclusion criteria are reported. There are 24 studies that met the inclusion criteria, of which 19 addressed identification issues properly. The studies are divided into the types of insurance on which they reported as well as the quality of the methods used to address identification issues.

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[2] http://iresearch.worldbank.org/lsms/lsmssurveyFinder.htm

**Table 4.2:** Description of health insurance and data

| Study | Health insurance | Cost sharing | Data |
|---|---|---|---|
| **Government-based social health insurance** | | | |
| Thornton and Field (2010) | 1. Type of HI: Health insurance programme to informal sector workers in Nicaragua. It is a voluntary scheme.<br><br>2. Enrolment rate: very low<br><br>3. Premium: Not free. Insured individuals and eligible dependents pay a flat monthly fee for covered services, but no co-payments at the time of service. The monthly fee is higher in the first two months, at approximately 18 dollars per month, and falls to approximately 15 dollars per month subsequently | Co-payment | Primary survey including both baseline and final survey among market vendors |
| King *et al*. (2009) | 1. Type of HI: *Mexican Seguro Popular de Salud* (Universal Health Insurance program or SP): a national health insurance programme in Mexico. Started in 2005.<br><br>2. Enrolment: Very low in the project setting that is examined.<br><br>3.Premium: Sliding scale by income, free for the poor | Unclear | Randomised trial conducted by the researchers |
| Sosa-Rubi *et al*. (2009a) | See King et al. (2009) | Unclear | Mexican National Health Survey conducted in 2005-2006, selected 3890 women who delivered between 2002-2006, no one with employer or private insurance |
| Sosa-Rubi *et al*. (2009b) | See King et al. (2009) | Unclear | Mexican National Health Survey, 1,491 adults with diabetes in 2006 |
| Dow and Schmeer (2003) | 1. Type of HI: National health insurance, primary and secondary care for low income group in Costa Rica<br><br>2. Enrolment rate: 73% of children, 1984 | No information | Vital statistics, registry census data, a panel of 87 to 97 regions |
| Trujillo *et al*. (2005) | 1. Type of HI: Subsidised health insurance program, national | No information | |

| Study | Health insurance | Cost sharing | Data |
|---|---|---|---|
|  | targeting for low-income families | | |
|  | 2. Enrolment rate: not reported | | |
|  | 3 Premium: 5 to 30% of unit cost of insurance | | |
| Miller *et al.* (2009) | See Trujillo *et al.* (2005) | No information | |
| Kraft *et al.* (2009) | 1.Type of HI: National health insurance in the Philippines<br><br>2. Enrolment rate: Unclear<br><br>3.Premium: Unclear | Unclear (third-party payment) | Quality improvement demonstration<br><br>Study (QIDS) – a large randomised controlled experiment assessing the effects of increasing insurance coverage (used both a baseline round in 2003 and a post-intervention round in 2006) |
| Bauhoff *et al.* (2011) | 1. Type of HI: The Medical Insurance Program in Georgia, established 2006, poorest 20% of Georgians, emergency care offered<br><br>2. Enrolment rate: Exact rate not reported, but states that the enrolment rate was low<br><br>3. Premium: Unclear | No co-payment | Survey of 3,500 households, especially designed for the study |
| Menash *et al.* (2010) | 1. Type of HI: National Health Insurance Scheme (NHIS), established in 2003 by the government of Ghana. A national programme<br><br>2. Enrolment rate: 55% of the total national population by the end of August 2007<br><br>3.Premium: Not free (but free only for the Core Poor category) | Co-payment | Survey by researcher: 393 insured women and 1,689 non-insured women randomly selected, then 565 pregnant women taken from the sample |
| Yip and Berman (2001) | 1. Type of HI: The School Health Insurance Programme (SHIP) in Egypt. A government-subsidised health insurance programme to target schoolchildren, established in 1992. The enrolment is | Co-payment | Nationwide Household Health Care Utilisation and Expenditure Survey conducted in the winter of 1994 |

| Study | Health insurance | Cost sharing | Data |
|---|---|---|---|
| | carried out through school, leaving out those not enrolled in school between the ages of 6-18. The package is comprehensive<br><br>2. National Enrolment Rate: 60.5%<br><br>3. Premium: Not free | | and summer of 1995. High response rate. Sampling frame from Egypt Demographic and Health Survey |
| Wagstaff and Lindelow (2008) | 1. Type of HI: Multiple health insurance schemes in China, implemented long ago and has undergone several changes. Unclear whether they are voluntary or mandatory but seems that some of them are voluntary.<br><br>2. Enrolment rate: In 1970, around 90% of the population covered but 1980 onwards the coverage fell down drastically, up to 20% of the rural population and 40% for urban population. But by 2003, almost 90% of the urban workers got health insurance.<br><br>3. Premium: Not free | Co-payment | Study used 3 surveys: 1) China Health and Nutrition Survey (CHNS) in 1991, 1993, 1997, 2000; 2) Gansu Survey of Children and Families (GSCF) in 2000, 2003; and 3) the World Bank Health VIII project baseline survey (H8BS) in 1998 |
| Wagstaff et al. (2009) | 1. Type of HI: a national health insurance programme called the New Cooperative Medical System (NCMS) in rural China and it operates at the county level. It is a voluntary scheme.<br><br>2. Enrolment rate: Unclear; (the study by Sun et al. (2009) reported that 85.7% of the rural population were covered in 2008<br><br>3. Premium: Not free. The minimum requirement was a 10 RMB contribution per person, supplemented by a subsidy of 20 RMB from local government, and a 20 RMB matching subsidy from central government in the case of enrolled households living in the poorer central and western provinces | Co-payment and ceilings | The study used two data sets:<br><br>1) The 2003 round of the National Health Service Survey (NHSS), administered by the Center for Health Statistics and Information (CHSI) of the Ministry of Health (MOH) and follow-up survey in 2005 by CHSI<br><br>2) Routine health facility survey: from MOH administrative database |
| Sun et al. (2009) | 1. Type of HI: a national health insurance programme called the New Cooperative Medical System (NCMS) in rural China and it operates at the county level. It is a voluntary scheme.<br><br>2. Enrolment rate: 85.7% of the rural population were covered in 2008 | Co-payments and ceilings | Cross-sectional primary survey (face to face) in Shandong and Ningxia provinces. Data collected were for May 2005 to April 2006. |

| Study | Health insurance | Cost sharing | Data |
|---|---|---|---|
| | 3.Premium: Not free | | |
| Yu *et al.* (2010) | 1. Type of HI: It is a National health insurance programme called the New Cooperative Medical System (NCMS) in rural China and it operates at the county level. It is a voluntary scheme. (In 2002 the State Council and the Central Committee of the Communist Party of China initiated the policy of the New Cooperative Medical Scheme (NCMS). This is a 'voluntary' and heavily subsidised scheme designed to reduce the financial burden of illness on the rural population.)<br><br>2. Enrolment rate: 85.7% of the rural population were covered in 2008 (It has been calculated that by the end of 2009, 95.3% of all counties and 91.5% (815 million) of the rural population would be covered by the NCMS)<br><br>3.Premium: Not free (but heavily subsidised) | Co-payment and ceilings | Cross-sectional primary survey (household survey) in Shandong and Ningxia provinces |
| Shi *et al.* (2010) | 1.Type of HI: NCMS of China (same as Yu 2010)<br><br>2. Enrolment rate: same as Yu 2010<br><br>3.Premium: same as Yu 2010 | Co-payment and ceilings | Cross-sectional household survey was conducted in 2008 in Hebei and Shaanxi provinces and the Inner Mongolia Autonomous Region |
| Lei and Lin (2009) | 1.Type of HI: NCMS of China (same as Yu *et al.* 2010)<br><br>2. Enrolment rate: same as Yu *et al.* (2010)<br><br>3. Premium: same as Yu *et al.* (2010) | Co-payment and ceilings | Longitudinal sample drawn from the China Health and Nutrition Survey (CHNS) of the years 2000, 2004, and 2006 |
| Sparrow *et al.* (2008) | 1.Type of HI: Subsidised social health insurance program (SSHI) for the poor In Indonesia, introduced in 2005.<br><br>2. Enrolment rate: 33% of total population<br><br>3.Premium: Fully subsidised (except the cost of a photograph for the health insurance card) | No information available on whether there were any co-payments or ceilings | This study uses data from *Susenas* (*Survei Sosial-Ekonomi Nasional* – National Socioeconomic Survey), which is Indonesia's main socioeconomic household survey. |
| Wagstaff (2010) | 1. Type of HI: Health care fund for the poor (HCFP) in Vietnam, introduced in 2003. It is a national level programme aimed at | No co-payment | The data used come from the panel element of the 2002, 2004 |

| Study | Health insurance | Cost sharing | Data |
|---|---|---|---|
| | covering all poor households and selected other groups with health insurance coverage at the taxpayers' expense. It is unclear whether it is voluntary or compulsory. In October 2002, through an edict known as Decision 1395, the government mandated all provincial governments to provide free health care to low-income and vulnerable groups (households defined as poor according to official government poverty standards)<br><br>2. Enrolment rate: As of 2006, the programme, which started in 2003, covered around 60% of those eligible, which accounts for about 23% of the population.<br><br>3.Premium: Free | | and 2006 Vietnam Household Living Standards Survey (VHLSS) multipurpose household survey. The VHLSS is a rotating panel, and there are 5,607 individuals from 1,689 households make up the panel over three waves. |
| Wagstaff (2007) | 1.Type of HI: same as Wagstaff (2010)<br><br>2. Enrolment rate: same as Wagstaff (2010)<br><br>3.Premium: same as Wagstaff (2010) | No co-payment | Vietnam Household Living Standards Survey 2004 |
| Axelson (2009) | 1.Type of HI: Same as Wagstaff (2010)<br><br>2. Enrolment rate: Same as Wagstaff (2010) (study reported 18% as the enrolment for 2002)<br><br>3.Premium: Same as Wagstaff (2010) | No co-payment | Vietnam Household Living Standards Survey (VHLSS) data 2002 (pre-programme) and 2004 (post-programme) |
| Jowett *et al*. (2003) | 1. Type of HI: Instituted in Vietnam and operated until 2003, it has two components: Compulsory and Voluntary, and the present study deals with the voluntary component. It targets: (i) schoolchildren; (ii) members of households below the poverty line who are eligible for free voluntary health insurance; and (iii) others, including the self-employed (i.e. farmers and service workers), employees of small enterprises, and in certain provinces government employees at the district level and below. Membership is currently based on individuals rather than families. | No co-payment | Data were collected through a household survey designed specifically to evaluate the impact of the scheme |

| Study | Health insurance | Cost sharing | Data |
|---|---|---|---|
| | 2. Enrolment rate: Schoolchildren have been the primary focus of the voluntary scheme to date, with 20% of the target group enrolled by the end of 1998. Amongst non-poor adults however, the purchase of voluntary health insurance is currently very low, at around 0.6% of the eligible population. This group is essential to the extension of health insurance into rural areas. Over 99% of low-income individuals eligible for free health insurance still await allocations from poverty alleviation funds or charities due to a lack of funds<br><br>3. Premium: Unclear whether it is free or not | | |
| Jowett *et al*. (2004) | 1. Type of HI: same as Jowett *et al*. (2003)<br><br>2. Enrolment rate: same as Jowett *et al*. (2003)<br><br>3. Premium: same as Jowett *et al*. (2003) | Co-payment | Same as Jowett *et al*. (2003) |
| Sepehri *et al*. (2006a) | 1. Type of HI: same as Jowett *et al*. (2003)<br><br>2. Enrolment rate: same as Jowett *et al*. (2003)<br><br>3. Premium: same as Jowett *et al*. (2003) | Co-payment for compulsory and voluntary HIs, and third-party payment for HI for the poor (HIP) | Vietnam National Health Survey (VNHS) 2001-02, conducted by the Ministry of Health and the General Statistics Office |
| Sepehri *et al*. (2006b) | Same as Sepehri *et al*. (2006b) | | |
| **Community-based health insurance (CBHI or CHI)** | | | |
| Gnawali *et al*. (2009) | 1. Type of HI: This is a regional specific community-based health insurance (CBHI) programme in Senegal. The HI was offered to households in a stepwise fashion (11 clusters per year), following a step-wedge cluster randomised community-based trial design in Senegal. It is a voluntary scheme.<br><br>2. Enrolment rate: The year 2006 marked the final point of the design, when CBHI was offered to everyone in the trial area. | No co-payment | Primary survey at household level |

| Study | Health insurance | Cost sharing | Data |
|-------|------------------|--------------|------|
| | 3. Premium: Not free. The premium was 1,500 CFA per adult per annum and 500 CFA per child per annum in a household ($1 = 655 CFA at that time) | | |
| Aggarwal (2010) | 1. Type of HI: The Yeshasvini Health Insurance Program in Karnataka, India: it is a regional programme for cooperative rural farmers and informal sector workers introduced in June 2003. It is a voluntary scheme.<br><br>2. Enrolment rate: 3.0 million in 2008-09<br><br>3. Premium: Not free | No Co-payment | Household survey |
| Devadasan *et al*. (2010) | 1. Type of HI: Community-based health insurance schemes in India. It is a voluntary scheme.<br><br>2. Enrolment rate: unclear<br><br>3. Premium: Not free | No co-payment | Household cohort study built by the study team |
| Jütting (2003) | 1. Type of HI: a community-based mutual health insurance programmes in Senegal. These are regional schemes and also voluntary<br><br>2. Enrolment rate: Unclear<br><br>3. Premium: Not free | Co-payment (50% coinsurance) | Household survey was carried out by the Institute for Health and Development (ISED) in Dakar in cooperation with the Center for Development Research in Bonn, in 2000 |
| Msuya (2004) | 1. Type of HI: Community-based health insurance scheme known as Community Health Funds *(*CHF), introduced by the government of Tanzania. The scheme was supported by the World Bank and was implemented for the first time in 1996. It is a voluntary scheme.<br><br>2. Enrolment rate: Unclear<br><br>3. Premium: Not free | Co-payment but not for very poor members | Household survey (REPOA-SUA Survey, 2000) |
| Dror *et al*. (2006) | 1. Type of HI: 6 regional community-based health insurance units | No co-payment | Cross-sectional household survey in |

| Study | Health insurance | Cost sharing | Data |
|---|---|---|---|
| | in the Philippines.<br><br>One unit (Guimaras Health Insurance Program – GHIP) was set up by the public authority, which also paid the contributions for older and poorer members; three units were created by cooperatives for their members.<br><br>2. Enrolment rate: Unclear<br><br>3. Premium: Not free | | 2002 |
| Smith and Sulzbach (2008) | 1. Type of HI: Community-based health insurance (CBHI) in 3 Sub-Saharan African countries - Senegal, Mali and Ghana. They are voluntary schemes<br><br>2. Enrolment rate:<br><br>2a. Senegal: 4.8% of Thie's population<br><br>2b. Mali Bla town, 4.1%; Kemeni, 4.5%, Wayerma, 11.4%; Bougoulaville, 3.5%<br><br>2c. Ghana 33.9% of Nkoranza population<br><br>3. Premium: Not free | Co-payment | Household surveys carried out by the USAID-funded Partners for Health Reformplus (PHRplus) Project between August and October 2004. |
| Dror *et al*. (2009) | 1. Type of HI: Three community-based regional health insurance schemes in India. All are voluntary<br><br>1a. From BAIF in Maharashtra (set up in 2002)<br><br>1b. Nidan insurance in Bihar<br><br>1c. UpLift Health in Maharashtra<br><br>2. Enrolment rate:<br><br>2 a. Nidan: 10,189 members in 2005<br><br>2b. UpLift Health: 16,356 members in 2005 | Co-payment | |

| Study | Health insurance | Cost sharing | Data |
|---|---|---|---|
|  | 3. Premium: Not free |  |  |
| Wang *et al.* (2009) | 1. Type of HI: Rural Mutual Health Care (RMHC) in China. It is a social experiment (SHI) that was conducted in one of China's western provinces from 2003 to 2006<br><br>2. Enrolment rate: 1,173 households<br><br>3. Premium: Not free, but heavily subsidised. | No co-payments (no deductibles) | The RMHC experiment adopted a pre-post treatment-control study design, with the panel data collected in 2002, 1 year prior to the intervention, and followed up in 2005, 2 years after the intervention, both in the intervention and control sites |

**Table 4.3:** Assessment of studies meeting identification methods and general comments

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| **Control for selection: use standard econometric/statistical methods** |  |  |  |
| **Government-based social health insurance** |  |  |  |
| Thornton and Field (2010) | Local average treatment effect estimation (LATE) | The authors randomised the allocation of incentives, which altered the probability of joining the scheme.<br><br>Strangely, enrolment was estimated by OLS rather than probit, including the instruments above; this is the LATE estimation.<br><br>Enrolment is not a model but a list of correlates.<br><br>They don't model the impact of utilisation on outcomes.<br><br>The study has poor external validity. It was conducted in Managua. The 3 biggest open markets were selected. 50% of hh refused to participate or were not found. A further 50% were lost at follow up for the same reasons and | Funded through the Global Development Network from the Bill and Melinda Gates Foundation |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| | | enrolment was only 20% of the sample. | |
| King *et al.* (2009) | RCT. Random assignment of clusters to a) no treatment and b) encouragement to enrol | The paper first reports intention to treat, and recognises the selection bias in that measure, then reports complier average treatment effects, which is the effect after excluding those who would never enrol and those who would always enrol. The methodology used to trim the sample in this way and the unit level used for comparing the control groups (matched households, group averages) are not explained. The authors call their method complier average causal effect (CACE) which assumes that only compliers from the treated site benefited from the insurance. This measure is non-parametric but most likely is a more restrictive assumption than LATE, which requires less stringent measures (see Angrist *et al.* 1996).<br><br>ITT estimations are offered. The authors report an average treatment effect that is not standard and we have not been able to verify its validity through literature search | The authors claim that the main endpoint of interest is catastrophic expenditure. They do not present this result on a table with standard errors. The claim that income is a denominator in this measure, and do not report the survey method used for this. This measure should be over a period of time; not clear what that is. Enrolment in the treated area is 44%; this could be thought of as low. Catastrophic expenditure was set at 30% of post-subsistence income, and the paper claims that this was reduced among the compliers. All other measures of well-being are in terms of assets.<br><br>Mexican Ministry of Health funded study |
| Sosa-Rubi *et al.* (2009a) | Multinomial model probit, IV method | Innovative multinomial probit model that takes into account that enrolment is endogenous through instrumenting by the time SP was introduced, assuming that there is no policy endogeneity. Justification for the Maximum Likelihood estimation is provided. Among the advantages of the model is that it takes only pregnant women in the sample. | Commissioned by Ministry of Health, Mexico |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| Sosa-Rubi *et al.* (2009b) | Propensity-score matching | Propensity-score matching with SP and non-SP. All poor are eligible for SP; as they are taken from a survey comparison is with those who may or may not have been offered SP. Presentation of balancing and selection equation. | Commissioned by Ministry of Health, Mexico |
| Dow and Schmeer (2003) | Regional data using fixed effect model, ITT estimation | ITT estimation on regions to detect differences in IMR due to changes in insurance uptake. Fixed effect in a two-period model with adjustment for low IMR in regions by using the Cox binary transformation method for the independent variable. | Policy endogeneity is taken into account in the first round of relatively few places having insurance through fixed effect; may be a weak method. National Institute for Child Health and Development, USA grant |
| Bauhoff *et al.* (2011) | Regression discontinuity design | ITT estimation through RDD methods with polynomial modelling for discontinuity. OOP expenditure is present through generalised log-link model to account for zero expenditure. Very low enrolment reported. No report on enrolment. | With very low enrolment reported by the authors, is ITT worth the trouble? Georgia Health and Social Health Implementation Center, Case Centre for Social and Economic Research Center, Georgia |
| Trujillo *et al.* (2005) | Propensity score matching | PSM, selection equation presented for the Colombian insurance, but no balancing results presented. Utilisation rate for households given | The University of Central Florida grant |
| Miller *et al.* (2009) | Regression discontinuity design | Non-linear modelling in breaks for eligibility. ITT estimation, but eligibility is modelled and the reported data are not used without correction; instrumental variable on actual enrolment is used. No accounting for zero expenditure for those who did not have expenditure on health care. | The Economic and Social Research Council, UK Inter-American Development Bank, National Institute of Child Health and Human Development and the Stanford Center on |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| | | | Demography and Economics of Health and Aging |
| Lei and Lin (2009) | Estimation of utilisation in NCMS in China using non-experimental panel data with three different estimation methods: i) panel with fixed effects ii) the latter with IV for entering into insurance; iii) difference in difference and then controlling for heterogeneity through propensity score matching | It is not clear whether the use of fixed effect over random effect is justified theoretically or through a Hausman test. The use of IV where the instrument is offering the insurance at the regional level is clearly justified; the test for random offering of the insurance (the exogeneity) at the regional level is clear and convincing. The instrumentation is a probability of enrolment for an individual. PSM is done at the individual level; no selection equation is offered. Balancing properties before and after are clearly reported. Results differ by estimation methods. The matching is done between all those who did take up the insurance and those who did not including those who were offered but did not take up the insurance.<br><br>Reports on the utilisation rate among those who self-report sick or being injured. | Data used for utilisation measure are those who self-reported being sick or injured. For health it is all those interviewed<br><br>No sub-group analysis.<br><br>The survey was conducted by the Carolina Population Center at the University of North Carolina at Chapel Hill, the National Institute of Nutrition and Food Society, and the Chinese Centre for Disease |
| Wagstaff *et al*. (2009) | Difference in difference and propensity score matching.<br><br>Individual survey from 10 counties while facility survey is from 200 counties | Insurance is offered in given areas. However, the uptake varies from 48-97%. There are areas where the programme is not implemented. When offered, the non-takers must be different from the takers. PSM is carried out across the takers in the offered areas with those in the non-implemented area. Removal of bias is stronger using the non-implemented areas. No selection model is presented.<br><br>It would be interesting to see the selection model on selection of the implementation areas. Mahananobis metric method was used to obtain propensity scores. Many of the treatment areas were discarded. | Accounts of the surveys do not report the drop-out in cohort.<br><br>Funding source: World Bank and DFID |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| | | A varied set of impacts are shown. | |
| Wagstaff and Lindelow (2008) | Several models are used to estimate the impact of insurance on health expenditure for three different panels of households:<br><br>1. A standard probit/Poisson model<br><br>2. An instrumented probit/Poisson model<br><br>3. A fixed-effect logit/Poisson model | Standard probit and Poisson are biased because of self-selection in the programme.<br><br>Instrumental variables used are head of household, number of working members of households, government officials, perceived quality of care and employment status (not entirely clear how these instruments affect uptake without affecting expenditure). But an over-identification test is used to examine if the variables are correctly excluded from the main equations.<br><br>Fixed-effect model rests on the assumption that there are no time-variant unobservables affecting both uptake and expenditure, because the FE only correct for the time-invariant unobservables, thus does not correct selection. | Some differences in questions and definitions of variables in the cohort data.<br><br>Funding source: The Fogarty International Center, The Spencer Foundation for Small and Major Grants Programs and the World Bank Research Committee |
| Jowett *et al*. (2004) | Estimation of impact of voluntary health insurance for the poor in Vietnam on health-seeking behaviour | This analysis uses an instrumental variable approach with multinomial logit to model the choice of health-seeking behaviour. The instrumentation on obtaining insurance is carried out on number of mass organisations of which the respondent is a member and membership interacted with per capita household income. The instrumentation is verified for exclusion criteria. Two sets of indicators are used with three choices in each: self-treatment, use of inpatient or outpatient services and self-treatment, and use of public or private service. | Data specifically collected for finding out how insurance is working.<br><br>Department for International Development (DFID), UK. |
| Wagstaff (2007) | Propensity score matching over a cross-section of a nationally representative survey | The selection equation employs per capita expenditure which might be affected by insurance status so is not a valid covariate. Uses trimming method through PSM weights, and then estimates impact through both PSM | Vietnam Household Living Standard Survey (VHLSS), developed by the World Bank, usually does not report drop-outs. But it is a well-tested |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| | | and OLS. | survey used in many developing countries and modified for the local area. Funding source not reported for the study. |
| Axelson *et al*. (2009) | Propensity score matching over a cross-section of a nationally representative survey and over double difference | PSM well described and the selection model used is good.<br><br>Not clear whether the panel sample (a subsection of the whole sample) is nationally representative. | Same as Wagstaff (2007). |
| Wagstaff (2010) | Triple difference, followed by regression methods | Differencing twice over three periods. One would expect propensity score matching to be used. Parallel trends would be assumed in a two-period difference for the measure to be valid. But if programme placement is from expected needs or outcome parallel trends, the assumption is not compelling. Differencing from an earlier period will capture the bias that may be present from programme placement bias.<br><br>The differences are then regressed on SES covariates. | Same as Wagstaff (2007). |
| Mensah *et al*. (2010) | Estimation of impact of insurance from a small study using propensity score matching | The selection equation is clearly reported. The bias reduction is reported as well. Not clear who the controls are; the description does not spell out if there are regions where insurance has not been implemented or has been very low. Unobservable differences may be significant. | Qualitative survey included. No mention of response rate.<br><br>Funded through the Global Development Network from the Bill and Melinda Gates Foundation |
| **Community-based health insurance (CBHI or CHI)** | | | |
| Gnawali *et al*. (2009) | Propensity score matching comparison.<br><br>Illustrative of inability to | The study was originally designed as a cluster-level randomised intervention. However, power calculations were based on the assumption of 50% enrolment, which turned out to be only 5%. The researchers therefore | CBHI in Senegal. Randomisation procedure not specified.<br><br>German research funding. |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| | obtain results through randomised trials.<br><br>Very small sample.<br><br>Standard bootstrap error; the only method available in the standard PSM methods available in the standard statistical package. | included in the sample households that were or had been insured independently. This generated a selection bias that was addressed using PSM.<br><br>The selection model is not based on theory.<br><br>The external validity of the outcomes is poor as this study detects effects of a very small percentage of participants.<br><br>Subgroup analysis is not made clear and as done by quartile, the sample is very small, less than 25 households in each quartile. | |
| Aggarwal (2010) | PSM over cross-sectional data | The selection equation is not reported; the selection equation does not seem strong judged from pseudo $R^2$. The average bias reductions are reported for the entire model and for each relevant variable. No trimming. | Cross-sectional survey post-implementation only. No information on response rate.<br><br>Funded through the Global Development Network from the Bill and Melinda Gates Foundation. |
| Wang et al. (2009) | Estimation of health outcomes through a randomisation at the village level. A quasi-experimental design; randomised from sites with ongoing rural mutual health care (RMHC) with matched control sites. Takes into account selection into insurance through propensity score matching; the impact is measured as a | The paper's methodology is well thought out in that matching is done with people who are not at the intervention site. Thus it avoids those who were offered the insurance but did not take it. As the control sites were somewhat matched, regional effects are similar and PSM is then used to match insurance takers with the non-takers on observables. | Subgroup analysis is offered; and sample size is clearly stated.<br><br>The authors do not state funding source; and declare that they have no conflicts. |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| | difference in difference. | | |
| **Control for selection: non-standard methods and without theoretical justifications** | | | |
| **Government-based, Social Health Insurance** | | | |
| Jowett *et al.* (2003) | Estimation of impact of voluntary insurance for poor informal workers in Vietnam on health expenditure using the inverse Mills ratio (IMR). The paper estimates the impact on health expenditures of insurance status using pooled samples of insured and uninsured. The effect of insurance is estimated using OLS regression with a selectivity term correction for the inequality in characteristics of the samples of insured and uninsured. The estimation employs the Heckman two-step procedure: the IMR from a probit regression estimating the probability of being insured is included in the OLS regression estimating determinants of health expenditure. The OLS regression is estimated for the sample of insured and | It is not clear how the IMR was calculated in this model. The 2-step Heckman selection correction is normally applied when the dependent variable is observed only in one of the two samples. The IMR is calculated using data from the two samples and then included in an OLS regression using data from one of the two samples. When the dependent variable is observed for both samples of insured and uninsured, the IMR is differently calculated for the insured and the uninsured after a probit estimation of the likelihood of being insured (see below). Then, the two different IMRs are included in two separate OLS regressions for the two samples. The regression coefficients of the two regressions are then compared. Discussions and examples from the literature of this procedure can be found in Cameron and Trivedi (2005, pp. 557-559) and Maddala (1983, pp. 223-227).<br><br>$$W_i = \emptyset \frac{\gamma'Z}{\Phi(\gamma'Z)}$$<br>$$W_j = \emptyset \frac{\gamma'Z}{1 - \Phi(\gamma'Z)}$$<br><br>$W_i$ and $W_j$ respectively represent the selection and the non-selection models.<br><br>The decision to use only non-zero expenditures is also questionable. The composition of the group with positive expenditure is likely to differ between the insured and | DFID funding. |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| | uninsured. The results of the probit selection equation are not shown and the dependent variable includes only non-zero values for health expenditure. | the uninsured because the insured group will include some low-spending costumers who would otherwise opt out were they not insured. The result is that the average expenditure among the insured can be underestimated (see Angrist and Pischke 2008, pp. 94-102). Several models have been proposed in the literature to address this issue, including: the Tobit model, the two-part model and selection models. None of these models is perfect, but dropping observations with zero values is hardly a solution. | |
| Sepehri *et al.* (2006b) | Cohort/panel data from 1993 to 1998, Vietnam Living Standards Survey; controls for individual effect across time to measure the effect of insurance on health expenditure. Testing to examine the choice of random fixed effect. | Use of truncated costs for those who undertook health costs or use of Tobit model to control for concealment of factors that shaped undertaking of costs. The fixed-effect and random-effect regression models by themselves produce different results. Random effects leads to the insured spending less than the uninsured in the panel data. After the Hausman test rejects the random-effect model in favour of the fixed-effect model which shows that the insured incur less costs, a group mean estimate is used to get a similar result from the random-effect model. Selection is partially corrected through individual effects with the group mean estimate.<br><br>We have not been able to corroborate this group mean estimates method. | National representative sample survey. Very high response rate. No information on funding. |
| Yip and Berman (2001) | Uses regression analysis after non-standard method for adjusting for selection | Estimate utilisation and out-of-pocket expenditure for those ill after adjusting to take account of impact of SHIP; the authors use recycling prediction method. First regressions are run to examine the insurance effect on undertaking OOP or utilisation. Then simulation is carried out for obtaining probability for these activities for all | Data from a general national health survey. Very high response rate.<br><br>Funding: United States Agency for International Development. |

| Study | Methodology to address selection | Comments on estimation | General comments on data and funding |
|---|---|---|---|
| | | individuals with SHIP, SHIP/no school and no school. | |
| Sparrow *et al.* (2008) | Estimating impact from a targeted programme, through difference in difference through a parametric fixed-effect model | The insurance is offered to the poor and very poor by enrolling all household members through a card with photographs which must be provided by the household. The authors note that there is a problem with targeting and they are convinced that there is selection into insurance. The authors recognise that the household fixed effect does not capture unobserved heterogeneity among individuals. As this is a panel estimation, the authors include self-reported health from two periods to partially solve this problem. They do note that men report higher illness than women do; there may be systematic bias.<br><br>The authors should have restricted their estimations to those who were ill for out-of-pocket expenditure. | The panel has a high degree of balance; attrition is mentioned and tested as to whether this is biased. They do not report the test, but report that they do not find systematic bias. Survey conducted by Statistics Indonesia (BPS), as an add-on the larger national socio-economic survey.<br><br>Subgroup analysis can be reported with a large number of cases in each income class.<br><br>The Indonesian government sponsored data collection. |
| **Community-based health insurance (CBHI or CHI)** | | | |
| Devadasan *et al.* (2010) | Uses informal matching method | Selection is controlled by matching the groups by characteristics; no reduction on the dimension.<br><br>The sample is extremely small. | Very detailed survey as households are visited every week over a year.<br><br>Funding: Institute of Tropical Medicine and The Sir Ratan Tata Trust, India |

# 5. Findings: study results

In this section, we summarise the enrolment rates, the determinants of enrolment and the impact of insurance once enrolled. We report impact results from all the studies that we finally included; some of them suffer from improper identification. However, in the discussions that follow, we make explicit the strength of the evidence by noting whether the study meets the inclusion criteria, thereby meeting identification criteria either fully or moderately. Unless stated, all outcome measures discussed come from these studies, numbering 24. We explicitly note when the results may be spurious by stating that the identification criteria are not met; that is, the results come from the 10 studies that did not recognise the problem of selection bias and thus the results have identification problems. The final section in this chapter summarises the results for the poorest group only from studies meeting fully the identification criteria, that is, the 19 studies that are of the highest quality. We emphasise the findings only from the 19 studies that fully meet the identification criteria.

## 5.1. Enrolment

Enrolment varied for the different types of insurance offered. For those insurance schemes which can be classified as community health insurance, enrolment ranged from 5.2 to 55 percent (see Table 5.2). The Vietnamese insurance offered before 2002 with co-payment of 20 percent had a very low uptake (Jowett *et al*. 2003). The insurance offered after 2002, the Vietnam Health Care Fund for the Poor (VHCFP) which was free with no co-payment, achieved varied rates of enrolment according to regions; the enrolment rate varied from 20-60 percent, although the poorest 20 percent of the population accounted for more than 50 percent of all insured ( Axelson *et al*. 2009; Wagstaff 2007, 2010). Although the national figure is not given, Bauhoff *et al*. (2011) found that in a sample of 3500 households, uptake of insurance was low. The New Cooperative Medical Scheme (NCMS) in China reported 48 percent to 98 percent enrolment by province (Wagstaff *et al*. 2009). For all insurance with co-payments, except for the Chinese NCMS, enrolment was below 65 percent. We cannot generalise about the enrolment rate due to the small number of cases. Studies by King *et al*. (2009) and Thornton and Field (2010) indicated that attempts at educating the public on insurance did not result in large enrolment; however, the latter study suggested that understanding insurance played a role in enrolment.

The enrolment pattern is not dissimilar to what has been observed for enrolment in other insurance schemes that do not involve health. Many development economists and those working in development agencies and governments would share the view expressed by 'the provision of insurance for the poor could well be a key milestone in the fight against poverty' (World Bank 2005). Yet, when offered even at low cost, the uptake has not been high for most types of insurance (Gine and Yang 2007; Gine *et al*. 2008). The reasons for the low uptake run counter to expectations. The degree of risk aversion had little impact on take-up, while, in contrast, a number of known households taking up insurance (Binswanger 1981; Pender 1996), education, wealth and trust in the insurer seem to have positive effects on take-up. Understanding the insurance product and involvement with microfinance institutions were also positive determinants of insurance take-up (Cole *et al*., 2009; Gine and Yang, 2007; Gine *et al*. 2008). Take-up of health insurance has mostly mirrored these findings.

Factors on which the uptake of insurance depended are described on Table 5.1. On reporting enrolment, we note that identification issues are straightforward in that

one can examine what factors affect selection through simple regression; that is, no result is based on prior selections that can affect the outcome of interest, enrolment into insurance. All studies reporting on factors influencing uptake of insurance, numbering only a few of the 34, used proper estimation methods. Although the determinants of uptake of insurance that the studies examined differ, some regularities are found:

1. Gender of head of the household seems not to matter, although there are some cases in which female-headed households are more likely to join.

2. There is no clear pattern in other demographic variables, although families with young children and families headed by the elderly seem to be more likely to join.

3. More educated households are consistently more likely to join, particularly if household member(s) have secondary or higher education degrees.

4. Participation in an insurance programme is also consistently correlated with per capita expenditure: richer households are more likely to join.

5. Initial conditions, such as chronic illnesses, seem not to influence the decision to join either way.

6. Residence in rural areas and distance from health facilities do not seem to deter households from joining insurance programmes.

**Table 5.1:** Determinants of enrolment

| Studies | Gnawali *et al.* (2009) | Thornton and Field (2010) | Sun *et al.* (2009) | Yu *et al.* (2010) | Wagstaff (2007) | Dror *et al.* (2009) | Axelson *et al.* (2008) | Mensah *et al.*(2010) (Purposive sample) | Msuya (2004) | Trujillo *et al.* (2005) | Sosa–Rubi *et al.* (2009a) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | Senegal (CHI) | Nicaragua (CHI) | China (SHI) | China (SHI) | Vietnam (SHI) | India (SHI) | Vietnam (SHI) | Ghana (SHI) | Tanzania (CHI) | Colombia (SHI) | Mexico (SHI) |
| Enrolment rate | 5.2% | 20.3% | 86% | 88–95.9% | 15% | | | 47%, 2–3 years implement-ation | | | |
| Method | Logistic regression | OLS regression | Comparison of means | Comparison of means | Probit regression | Comparison of means | Logistic regression | Probit regression | Probit regression | Logit regression | Logit regression |
| Age | + for >65 | | No effect | | + on age | | Non-linear effects | No effect | (−)age | + | No effect |
| Gender | No effect | No effect | (−) males with chronic disease | | (−) for males | | No effect | | No effect | + Males | + Females |
| Education | + Primary and secondary | No effect | | | + all categories | Effect unclear | + secondary and above | + inter-mediate and above | No effect of literacy | – above primary | No effect |
| Income | + 3rd and 4th quartile | + log of income | No effect | No effect | | No effect | No effect | + for various HH assets | + on log income | – for HH assets | – higher asset |

| Studies | Gnawali *et al.* (2009) | Thornton and Field (2010) | Sun *et al.* (2009) | Yu *et al.* (2010) | Wagstaff (2007) | Dror *et al.* (2009) | Axelson *et al.* (2008) | Mensah *et al.*(2010) (Purposive sample) | Msuya (2004) | Trujillo *et al.* (2005) | Sosa–Rubi *et al.* (2009a) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Household size | – on household size | (–) on number of children | | | + on size | | + household size | | + on log size | + | |
| Children | + for <5 | + for >12 | | | | | + <16 | | | | |
| Rural/urban | No effect | | | | No effect | | | – for 1/4th of the district | | | – urban |
| Distance | No effect | | | | | | | + | | | |
| Initial conditions | | + for chronic disease | | No effect (initial health) | | | | | No effect (Illness) | – for good health | |
| Other | None – occupation | | | | | | | None (married) | | None (married) | + married<br><br>None (ethnicity) |

## 5.2. Utilisation

Table 5.2 reports on the impact of insurance for all 28 studies, specifically on utilisation of healthcare services and financial protection. We also include other issues on which the study may have reported, such as health improvement; unfortunately, there were very few studies that reported on this. As some of the studies report differences in difference measures (outcomes being differenced in time separately for the insured and the non-insured and then compared), some results should be understood as changes. Thus, for example, we would report a larger increase in utilisation or a larger decrease in catastrophic expenditure for the insured in comparison to the corresponding figures for the uninsured. For cross-sections, there will simply be a higher or lower figure for the corresponding outcomes.

Below, we first compare the results for the insurance schemes for which we found multiple studies. We then report on individual insurances for which we found studies. Finally, we draw some general lessons.

For insurance under the New Cooperative Medical System (NCMS), the current insurance in place in China, Wagstaff *et al.* (2009) report larger increases in doctor visits and inpatient services for the insured. This study also reports that poorer groups experience less of an effect compared with those above the 20-percentile income bracket. Lei and Lin (2009) report no significant evidence that NCMS results in higher usage of formal care, although it decreases the use of Chinese folk medicine. Three reports that did not meet the identification criteria report show: no significant impact on inpatient service utilisation (Shi *et al.* 2010); no higher use of health care among the insured for chronic illnesses, although among the insured there is higher prevalence of chronic diseases (Sun *et al.* 2009); and similar results to those of Wagstaff *et al.* (2009) and Yu *et al.* (2010).

For a previous type of insurance in China (Cooperative Medical System, CMS), which had a strong component of fee for service for providers, Wagstaff and Lindelow (2008) report that the insured use services at a higher rate, while there is a lower use of private clinics. Within the services used, there is a greater inclination among the insured to use hospital care.

For the earlier Vietnamese insurance, pre-2002, with co-payment as a feature of the insurance, Jowett *et al.* (2004) report that insurance yields higher usage of inpatient services; this value is lower for the wealthier insured. For the period before 2002, the insured used public services more than private services. Sepehri *et al.* (2006 b), not taking selection into account but taking into account excessive zeroes in the data due to the non-users, report higher length of stay and hospital admission for the insured. For the Vietnam Health care Fund for the Poor (VHFCP) currently in place and implemented since 2002, we report from three studies that correct for selection: Wagstaff (2007) reports higher usage for inpatient and outpatient care and that the poor use both of these services less than the rich. Axelson *et al.* (2009) and Wagstaff (2010) report no increase in utilisation when outpatient and inpatient visits are aggregated for all service points. This study also reports selective programme placement in some regions for the new Vietnamese insurance. In conclusion, we cannot report an overall higher utilisation rate for the insured in comparison to the uninsured for the current Vietnamese scheme.

The study by King *et al.* (2009) for a large sample in Mexico found no differences in utilisation between the insured under *Seguro Popular* (SP) and uninsured for a period of 10 months after the insurance was rolled out through a campaign. The Mexican study attempted to find out whether large, well-designed insurance campaigns can yield higher utilisation. Thus, it is an interesting finding that the

campaign of 10 months did not yield greater utilisation by the insured. Samples for other countries found in our review were smaller. Restricting the sample to only those who are ill, in this case only diabetics, Sosa-Rubi *et al*. (2009a) show higher utilisation rate for those with SP than those without SP. For SHI, Thornton and Field find no higher utilisation among the insured for the state-run Nicaraguan insurance scheme. Trujillo *et al*. (2005) and Miller *et al*. (2009) indicate greater usage by the insured under the Colombian subsidised insurance for the poor programme; Miller *et al*. (2009) report higher usage of preventive care due to a recently imposed incentive structure for the providers. However, both also report no effect for inpatient care; this may indicate that the referral service may work equally well for the insured as well as the non-insured.

Bauhoff *et al*. (2011) report no effect on utilisation from the Georgian insurance for the poor. Egyptian insurance for children yielded higher usage of medical care for the insured among the lower income groups (Yip and Berman, 2001). For the Ghanaian SHI, Mensah *et al*. (2010) find higher utilisation for the insured. Kraft *et al*. (2009), for an insurance scheme in the Philippines, report a different measure: they report a drop in delay in seeking care for the insured over a period of time. Selection is not taken into account, although the study uses data from a randomised assignment. The extension of SHI to the poor, through a targeted enrolment scheme in Indonesia, improved access to health care for the insured. It reduced the use of private care, which was an intention of the insurance scheme (Sparrow *et al*. 2008).

For CBHIs, Aggarwal (2010) and Devadasan *et al*. (2010) find higher utilisation of health services for the insured in India. For a very small study, Gnawali *et al*. (2009) find an increase in utilisation for a small CBHI in Burkina Faso. Dror *et al*. (2009), while not meeting the identification criteria, show no significant increase in utilisation for the insured in urban areas of two states in India. Four CBHI studies, not controlling for selection, show higher use for the insured (Dror *et al*. 2006; Jütting 2003; Msuya 2004; Smith and Sulzbach 2008). The results regarding utilisation from the studies on SHIs are much more mixed than those for CBHIs.

Key points that can be summarised are:

1.  The evidence on utilisation is mixed. For two countries we find studies that report no higher utilisation among the insured: Georgia and Nicaragua. In China and Vietnam, evidence is mixed for the same state-sponsored large insurance programme when different studies are examined. Two studies report different results for Mexico. Some studies that report higher outpatient care for the insured reported no difference in the use of inpatient care.

2.  Overall, CBHI studies report a positive effect of insurance on utilisation more than for extended SHIs; the CBHI studies did not take selection into account more than the SHI studies. The problem of intentional programme placement may be more acute among the CBHIs than for SHIs. Thus, matching with some outside group that is not offered insurance should be critical for obtaining realistic results.

3.  The results differ for the poorest population, but not in any particular direction.

4.  Restricting ourselves to studies that met inclusion criteria strongly, we cannot offer a uniform view on utilisation.

## 5.3. Out-of-pocket expenditure

A study by Wagstaff and Lindelow (2008) on China's insurance through CMS before 2003 shows higher OOP expenditure among the insured in a poor region; the authors note that providers charged a fee for services. They also recognise that at various threshold levels of financial risk, as measured by catastrophic expenditure, the insured face higher financial risk. The picture is very mixed with NCMS. OOP expenditure declines more for the insured as shown in panel/cohort data for specific kinds of care (Wagstaff *et al.* 2009). Comparatively, the effect on poorer groups is less, but nevertheless in the same direction. For NCMS insured, while not correcting for selection, Sun *et al.* (2009) report catastrophic expenditure, at 40 percent of non-food expenditure, to be lower for the insured, while no protection is found by Shi *et al.* (2010) against catastrophic expenditure measured at 40 percent of 'capacity to pay'. In China, we cannot claim that either CMS or NCMS provided reductions in financial risk.

For Vietnam, the evidence indicates that greater protection is provided by the current VHCFP, although the results critically depend on the specification of the estimations after selection is taken into account: using cohort/panel data, Axelson *et al.* (2009) and Wagstaff (2010) show lower OOP expenditure for the insured. However, Wagstaff (2007) and again Axelson *et al.* (2009), with slightly different sets of data, find that the results for reduced expenditure do not hold for VHCFP, although the results for Wagstaff (2007) fluctuate depending on the specification for the estimation. For insurance prior to VHCFP, methods less capable of taking into account the selection effect report lower OOP expenditure for the insured (Jowett *et al.* 2003; Sepehri *et al.* 2006a and b).

For Mexico, King *et al.* (2009) report significant risk protection through SP insurance, although the study is not clear on how expenditure was measured, and selection issues centre mostly on catastrophic expenditure. Sosa-Rubi *et al.* (2009b) show that government-run SP hospitals are preferred over other types of hospital by pregnant women under SP, but they show an inclination to use a private hospital over a government hospital when they do not use SP. The implication for costs is that the higher cost of care is not always mitigated under insurance. Thornton and Field (2010) for Nicaragua show no change, and even show slightly higher costs depending on whether or not the insurance fee is taken into account as a health cost. Miller *et al.* (2009) show lower OOP expenditure for those under the Colombian programme; more importantly they show that those with insurance incur lower incidences of high OOP expenditure.

Bauhoff *et al.* (2011) for Georgia show no effect on OOP expenditure for outpatient care except for the elderly; however, they show lower OOP expenditure levels for those who receive inpatient care. State-sponsored insurance for children in Egypt generated lower expenditure for the middle-income earners (Yip and Berman, 2001); the result does not hold for other income groups. For a CBHI intervention in India, Aggarwal (2010) offers mixed results: in the case of surgery, there is a decline in financial risk for the insured; in the overall sample of those insured, however, there is a rise in OOP expenditure. For a set of CBHI studies that do not control for selection, we observe lower financial expenditure for the insured (Jütting *et al.* 2001; Msuya 2004; Smith and Sulzbach 2008), while Dror *et al.* (2009), for urban areas in India, show no difference in OOP expenditure between the insured and non-insured. The extension of SHI to the poor in Indonesia did not lead to any effect on OOP expenditure for the insured; the effect on the poor was that insurance increased OOP expenditure (Sparrow *et al.* 2008).

In cases where OOP expenditure is not less for the insured, an explanation could be that greater use of medical care goes hand in hand with greater informal payments or other expenditures not covered through insurance, such as some levels of co-payments (Wagstaff 2007; Wagstaff and Lindelow 2008). It is possible that in China, the older CMS insurance may have induced people to seek care with service providers that might be perceived to be of better quality, and this could be correlated with undertaking costs not completely covered by insurance (Wagstaff and Lindelow 2008). Yu *et al.* (2010) report a very low overall reimbursement for the more recent NCMS; they also report a fall in reimbursement to be correlated with greater severity in illness. It is not clear why effective financial protection should be lower for the poor in many instances. One reason could be that the poor without insurance seek care very infrequently; in contrast, those with insurance incur costs such as transport (Wagstaff 2007).

Key points that can be summarised are:

1. It is not always the case that insurance is able to reduce OOP expenditure for the insured. The results are highly mixed even for the same insurance scheme. Significantly, two large studies which take into account selection, one for the newer insurance scheme in China and one for Mexico show a decline in OOP expenditure. But in the case of Mexico, the result pertains mostly to catastrophic expenditure. Another study yields mixed results. It is encouraging to find in some cases lower incidences of high OOP expenditure for those insured.

2. The result for the poor is more modest when overall OOP expenditure is lower for the insured.

3. When only studies that take selection into account are considered, SHIs report more modest results than CBHIs. This difference persists with CBHIs that do not take selection into account.

## 5.4. Health status and other measures

A few studies reported on health measures. Thornton and Field (2010) for Nicaragua show no improvement in health. Sosa-Rubi *et al.* (2009a) show, for a pool of diabetic patients, a higher rate of management of diabetes among the insured. Dow and Schmeer (2003) find no effect of insurance at the regional level for a Costa Rican insurance. Mensah *et al.* (2010) show lower levels of infant death; these are not statistically significant. Wang *et al.*(2009), using EQ-5D instruments (a standard international measure) to assess health, report from a community-based health insurance in China that the scheme had positive effects on health status for the overall population as well as for those poor who were within the scheme. Lei and Lin (2009) find no improvement in health status for the Chinese NCMS.

Some other measures include insurance retention (Thornton and Field 2010); the result is that there is no improvement in retention due to subsidies. This paper also shows that there is considerable confusion about the benefits covered and in obtaining relevant documents. These types of factors would affect enrolment. The impact of insurance for the insured would also be affected if reimbursement mechanisms or hospital admittance were fraught with corruption (Yu *et al.* 2010).

**Table 5.2:** Impact reported from studies reviewed

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| **Government-based social health insurance schemes** | | | | | |
| **Identification criteria strongly met** | | | | | |
| Thornton and Field (2010)<br><br>Country: Nicaragua<br><br>Scheme: Insurance for the informal sector, instituted by a micro-finance group | Randomised incentive payments<br><br>Local area average treatment effect of cross section: regression based | No significant effect on the overall healthcare utilisation<br><br>Fairly substantial substitution away from use of public and private facilities into the healthcare facilities covered by the insurance<br><br>Social security hospital usage is significantly higher<br><br>Decline in use of under-resourced facilities for the insured | Total out-of-pocket expenditure was reduced among insured individuals, but the average out-of-pocket savings were lower than the equivalent unsubsidised insurance premiums<br><br>No effect on costs, drop in laboratory costs<br><br>Delivery of insurance mattered to a small degree | No differences in health observed | Subsidies had no impact on retention in the insurance scheme. Confusion about benefits covered. With the experiment only 20.3% enrolled. |
| King *et al.*(2009)<br><br>Country: Mexico<br><br>*Scheme: Seguro Popular*; randomised campaign to join insurance | 74 randomised clusters fromr 7,078 matched health clusters in 13 states. 50 are followed up. Enrolment was among the endpoints. Assessment after 10 months. N = 32,515 | Reporting only for the compliers, not intention to treat: insurance showed no effect on utilisation. Similar results for the poor. Not clear what the question asked was. | Reduction in out-of-pocket expenditure for the insured. Considerable less expenditure among those who participated in the insurance uptake after controlling for selection for the poorer households for all health expenditure. For specific inpatient and outpatient care, there is less expenditure among the | - | Campaign increased uptake, but not to a high level |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| | hh. | | insured and those with low assets. Catastrophic expenditure is reduced; threshold at 30% of post-subsistence income | | |
| Sosa-Rubi *et al.* (2009a)<br><br>Country: Mexico<br><br>Scheme: *Seguro Popular* | Sample: 3,890 pregnant women who delivered in 2002-2006 with either SP or no insurance. Multinomial model for selection of hospitals by pregnant women | As these were all pregnant women, general costs are associated with choosing each type of hospital | Those with SP prefer SP hospitals – the cheapest care – over private care and non-SP government hospital service care. Private care is preferred over less-expensive non-SP government care | | No clear indication of cost implications |
| Sosa-Rubi *et al.* (2009b)<br><br>Country: Mexico<br><br>Scheme: *Seguro Popular* | PSM, 1,491 diabetic adults, no pregnant women and those with social security service insurance used complete data for all. | Those with SP had better access to diabetes care. They numbered proportionately higher in having insulin shots, regular tests and physician visits | | Higher proportion of the insured had glucose control and lower proportion had very poor glucose control | |
| Trujillo *et al.* (2005)<br><br>Country: Colombia<br><br>Scheme: Subsidised Health Insurance Program | PSM and IV estimations are compared, and yield roughly the same results | Greatly increased medical care utilisation among the country's poor, including children, women and the elderly | | | |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| Miller *et al.* (2009)<br><br>Country: Colombia<br><br>Scheme: Subsidised Health Insurance Program | RDD estimation, with eligibility imputed through use of IV estimation | ITT estimations: substantial higher use of traditionally under-utilised preventive services for those with HI | ITT estimations: no significant effect on average outpatient expenditure<br><br>Lowers inpatient expenditure and lowers incidence of high-end expenditure among the insured | | Study finds increased use of preventive care as the scheme included incentive for service providers to deliver preventive care |
| Bauhoff *et al.* (2011)<br><br>Country: Georgia<br><br>Scheme: The Medical Insurance Program for the Poor | RDD estimation with 3,500 households | No impact on utilisation | No robust evidence of lower expenditure among insured outpatient expenditure, except with the elderly<br><br>Lower expenditure among insured for inpatient care | | Usually one expects lower estimation of impact from ITT. The low estimation could be result of that |
| Mensah *et al.* (2010)<br><br>Country: Ghana<br><br>Scheme: National Health Insurance Scheme; significant subsidy for the poor | Sample: 400 insured and 1,600 non-insured from the same area, to detect the effect of insurance after 4 years. PSM is used to match the insured and non-insured. Only pregnant women make up the | SHI has yielded some verifiable positive outcomes: the insured women who are enrolled are more likely to receive higher levels of pre-natal care, have more preventive health check-ups; more likely to give birth in hospitals and to have their births attended by trained health professionals | - | Significantly lower levels of infant deaths and fewer birth complications | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| | sample | | | | |
| Dow and Schmeer (2003)<br><br>Country: Cost Rica<br><br>Scheme: National Health Insurance targeted for the poor | Panel data; uses fixed-effect model to obtain regional ITT estimation. Policy endogeneity is limited due to high level of regional adoption, but initial adoption is low. | | | No impact on decline in community infant mortality rate (IMR) from having an increased proportion of the population insured over time | Policy endogeneity may still be a problem at the regional level as initial level of uptake is less than half of the region |
| Wagstaff and Lindelow (2008)<br><br>Country: China<br><br>Scheme: New Cooperative Medical System (NCMS); fee for service provider payment through the cooperative medical system (CMS) | Data from three households surveys; two sets are cohorts, the other cross-sections (poorer areas)<br><br>IV regression estimations with fixed effect (on the person) using probit or Poisson regressions. For modelling choice of providers, providers are rank ordered by costs on one of the cohort data; Use of IV regression for one of the cross- | - | Overall, health insurance *raises* rather than reduces out-of-pocket spending and the risk of catastrophic and large expenses<br><br>IV estimation for the poorer region shows overall increase in out-of-pocket expenditure. IV estimation for the cohorts shows no higher costs for the insured. However, for the insured, all surveys show that there is significant increase on risk of incurring out-of-pocket spending and the risk of catastrophic expenditure at 5% threshold (from income). Results from one of the cohort surveys showed significant increase in the risk of | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| | sections. | | catastrophic payment at a higher threshold. | | |
| Wagstaff *et al*. (2009)<br><br>Country: China<br><br>Scheme: New Cooperative Medical System (NCMS); voluntary<br><br>Coverage shallow | Baseline for the cohort was 2003, followed up at 2005. Specifically designed survey to test the results<br><br>Matching propensity score on difference in difference both at individual level and facility base level<br><br>Individual study based on 10 counties; facility based on 200 counties | The scheme has increased outpatient and inpatient utilisation: significant positive insurance impact as measured by ATT and weighted differences through kernel matching at the individual level. Households with insurance have more doctor visits, inpatient spells; results differ by health centres.<br><br>Impact on the poor:<br><br>NCMS has apparently had a larger impact among the poor in the use of outpatient care at village and township levels, and a smaller impact in the use of outpatient facilities at county hospital level. The impact is smaller for those who are poorer, significantly for inpatient spells and by type of facilities<br><br>Not clear if only the relative differences are significant or if the poor insured do indeed | Out-of-pocket payments overall have not been reduced: it has not reduced out-of-pocket expenses per outpatient visit or inpatient spell. OOP expenditure falls by a greater amount for the insured when compared to the uninsured for deliveries; for only one level of kernel matching overall OOP expenditure rises at a higher amount for those insured. OOP expenditure for per outpatient visit increases at all matching level at a higher level for the insured.<br><br>Impacts on the poor:<br><br>All effects for the poor insured are smaller. Out-of-pocket spending impacts were less pronounced among the poorest 20%. NCMS has produced a smaller reduction in the cost of deliveries among the poor than among the rich, and a smaller increase in out-of-pocket spending on other | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| | | experience changes | items | | |
| Lei and Lin (2009)<br><br>Country: China<br><br>Scheme: New Cooperative Medical System (NCMS) | N= 17,984; 14,005 observations (78%) are uninsured, 2,268 (13%) are covered under the NCMS and 1,711 (10%) are covered under other insurance schemes<br><br>Using a longitudinal sample drawn from the China Health and Nutrition Survey (CHNS), the study employed multiple estimation strategies (individual fixed-effect models, instrumental variable estimation, and difference-in-differences estimation with propensity score matching) to correct the potential selection bias | No significant evidence that NCMS increases utilisation of formal medical services. But it significantly decreases the use of traditional Chinese folk doctors and increases the utilisation of preventive care, particularly general physical examinations | No significant evidence that it decreases out-of-pocket expenditure | No significant evidence that it improves health status, as measured by self-reported health status and by sickness or injury in the previous four weeks | |
| Wagstaff (2007)<br><br>Country: Vietnam | Single-period data, from 2004, Vietnamese | VHCFP has increased both outpatient and inpatient utilisation but substantially | VHCFP has not reduced average out-of-pocket spending but has reduced the | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| Scheme: Vietnam's Health Care Fund for the Poor (VHCFP), introduced in 2002<br><br>All households eligible receive free insurance and need not apply to be considered for identification; biases into entry is still possible | Household Living Standards Survey (VHLSS). The propensity score matching kernel weighted average is presented but regressions are also used after trimming through PSM. Matching estimates for subgroups are presented | increased inpatient care utilisation<br><br>The PSM measures on full data set, only strictly based on matching eligibility and the trimmed data set from kernel weights give the same directional results. Different levels of government facilities are used at higher rates; see Axelson *et al.* (2000) below<br><br>Impact on Poor:<br><br>Negligible impacts on utilisation among the poor deciles<br><br>Richer groups (>20 percentile of income) had higher outpatient and (>10%) inpatient utilisation | risk of catastrophic spending. Total out-of-pocket health spending is reduced in the simple PSM but not with the regression or trimmed matching. The same result is found across estimations of catastrophic payment, with the threshold at 10% of non-food consumption<br><br>Impact on the poor:<br><br>VHCFP has not reduced average out-of-pocket spending but there was substantial reduction in catastrophic health spending.<br><br>Lower-income insured group (<20 percentile of income) experienced less catastrophic payments | | |
| Axelson *et al.*(2009)<br><br>Country: Vietnam<br><br>Scheme: Vietnam's Health Care Fund for the Poor (VHCFP). | Two periods of VHLSS, 2002 and 2004. PSM selection into the insurance and then differences and double differences are measured; the double differences (DID) is to take | VHCFP had small, positive impact on overall healthcare utilisation. The insured do not have higher difference of utilisation of inpatient and outpatient care. Statistically significant effect is present only for outpatient visits in commune hospital. The results | VHCFP reduced out-of-pocket health expenditure. The insured had lower OOP expenditure for inpatient care, one of the main results sought for insurance. The result from the double differences differs from the cross-section, as in the case of | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|-------|---------------------------------------------|-------------|----------------------------------|----------------|-------------------|
| | account of person effect through time. Double difference result presented | differ from the cross-section. Further, there is evidence of substitution from private to public providers and also from primary to secondary and tertiary level care | utilisation | | |
| Wagstaff (2010) Country: Vietnam Scheme: Vietnam's Health Care Fund for the Poor (VHCFP) | Three waves of VHLSS surveys, from 2002, 2004 and 2006; some doubts as to whether the survey captures insurance status or some other status (no correction made). Differences in difference over three periods (as well across two and single period differences) where coverage is low in 2002 cohort. This value is regressed with two specifications with an insurance dummy and SES and demographic variables | VHCFP had no impact on the use of healthcare services. Specification-neutral ATT results from differencing across the three period: regressions produced no statistically significant higher number of outpatient or inpatient visits for the insured | VHCFP substantially reduced out-of-pocket health spending. Specification-neutral result is that for the insured, expenditure declined over the previous 12 months; the difference in differences across the three periods provides stronger result for the insured. The result is consistently stronger when covariates serve as the control in the impact estimate | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| Jowett *et al.*(2004)<br><br>Country: Vietnam<br><br>Scheme: Voluntary component of Vietnam's health insurance (before the introduction of VHCFP); self-employed (1% of the eligible) insured and children (high uptake). Insured designate a public health facility | Purposive sampling, randomly selected 40% insured and 60% uninsured. Only ill are selected from a sample of 2,632 contacted people for the analysis. Treatment-seeking behaviour by health facility is modelled through multinomial method after taking account of selection into insurance | Overall, the insured patients are more likely to use outpatient facilities and public providers<br><br>IV Multinomial model for two discrete choices: inpatient or self-treatment, outpatient and self-treatment. Insurance increases use of inpatient services; the value is reduced for those who are wealthier<br><br>Similar multinomial model for two sets of choices: self-treatment or public hospital and self-treatment and private facility. Insurance increases use of public services, with a reduction in effect for the wealthier group.<br><br>Impact on the poor:<br><br>The insured patients from the lower-income levels are more likely to use outpatient facilities and public providers | - | - | - |
| **Identification criteria moderately met** | | | | | |
| Yip and Berman (2001) | Sample collected in 1994, 10,644 HH, N=53,384, restricted | The SHIP significantly improved access by increasing healthcare visit rates: higher usage of | The log-linear model shows lower expenditure for those with insurance, which means | - | The authors carry out simulation |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| Country: Egypt<br><br>Scheme: School Health Insurance Programme (SHIP); Voluntary enrolment with parental contribution; excludes those who cannot pay and those not in school | to 6-18 years old. High percentage interviewed<br><br>Use of regression and then simulation to account for selection. Analysis restricted to 2 weeks to account for endogeneity in use of health care and undertaking expenditure. Probit model for utilisation and taking on expenditure at all (not reported) followed by log linear model for expenditure | healthcare with SHIP in comparison to children not in school and those in school but not insured. The effect is significant for all income groups excepting the higher income group<br><br>The simulation effect shows that SHIP also reduced the differentials in visit rates between the rich and the poor | that SHIP reduces financial burden of use (out-of-pocket expenditures). When analysed by income groups, the middle income group is the only one receiving a significant effect. The simulation effect shows that SHIP reduces expenditure for the middle-income group, not for the poor | | exercise on financial viability of the scheme. They show that financial outlay in official accounts may be less than it actually is |
| Sparrow *et al.* (2008)<br><br>Country: Indonesia<br><br>Scheme: Subsidised Social Health Insurance (SSHI) for the Poor | N= 10,575<br><br>The household panel was set up in 2005 by randomly selecting 10,575 households from the cross-section sample, which were revisited in 2006 and 2007 | The SSHI has improved access to health care: it increased access to primary and tertiary care as well as the utilisation of outpatient and inpatient care. It increased utilisation of outpatient care at public healthcare facilities but reduced the utilisation of private healthcare facilities | The SSHI has not led to a decrease in out-of-pocket health payments, but the household budget share that the poor allocate to health care has increased<br><br>Indirect costs continue to restrict the poor from seeking health care, even after direct costs barriers have been | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| | The difference-in-difference estimates are obtained by including household fixed effects | Impacts on the poor:<br><br>1. The SSHI increases the likelihood of any member of poor households using primary facilities by 93.7% (derived from logit coefficient of 0.661) but has a slightly negative impact on the number of visits to primary facilities<br><br>2. Strong impact of SSHI on the use of tertiary facilities by the poor as there is an increase in the average number of visits by 1.156 visits per person per month<br><br>3. There is positive impact on utilisation of outpatient care at public care facilities but impact is relatively lesser than for rich people<br><br>4. The impact of SSHI on inpatient utilisation is largest for the non-poor | reduced by SSHI<br><br>Impact on the poor:<br><br>SSHI is consistently associated with increased out-of-pocket budget shares for the two poorest quintiles | | |
| Jowett *et al.* (2003)<br><br>Country: Vietnam<br><br>Scheme: Voluntary component of Vietnam's health | Purposive sampling, from those insured and those not insured; further eliminated are those with expenditure of | - | Overall, health insurance reduces average out-of-pocket expenditures by approximately 20%.<br><br>IMR variable is significant, | | The conclusion from the interactive model is incorrect. The comparators |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| insurance (before the introduction of VHCFP) | 0, about 63% of the original sample. Inverse Mills Ratio (IMR) for selection but no correction for non-selection, 980 sample. Heckman regression with income and health status | | indicating significant selection into insurance in the Heckman specifications. Two IMR models (one with the identification of only significant variables) show reduced expenditure for the insured<br><br>Impact on the poor:<br><br>The health insurance reduces expenditures significantly more for the poor than for the rich | | are different. Thus the claim regarding the richer people having less of an effect may not hold. This inclusion makes the insured variable insignificant for the overall sample |
| Sepehri *et al.*(2006b)<br><br>Country: Vietnam<br><br>Scheme: Voluntary component of Vietnam's health insurance (before the introduction of VHCFP) | N=17,450 panel from 1993 and 1998, VLSS; uses regression method with panel individual effect, adjusted for those undertaking some care: excluding those not taking any care or use of Tobit (censor value for selecting into care, not insurance) | - | Models give different results. Health insurance reduces out-of-pocket health expenditure (between 16 and 18%)<br><br>Impacts on the poor:<br><br>The reduction in out-of-pocket health expenditure is more pronounced for individuals with lower incomes | - | - |
| **Identification criteria not met** | | | | | |
| Kraft *et al.* (2009)<br><br>Country: Philippines | Baseline measurements undertaken in 2003- | Reduction in delay in healthcare seeking: with insurance intervention 5 | - | | |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| Scheme: Part of the Philippines Child Health Insurance and Policy Experiment; intervention was expansion of insurance coverage to include children under 5 years. | 04, with post-intervention measurements carried out in 2006. N=4,070 children. Difference-in-difference analysis carried out with control variables in logistic form regression | additional children in 100 do not delay going to the hospital<br><br>Delays in seeking care (less than 3 days from the onset of illness) reduced in difference in difference measure | | | |
| Sepehri *et al.* (2006a)<br><br>Country: Vietnam<br><br>Scheme: Voluntary component of Vietnam's health insurance (before the introduction of VHFCP) | N=158,000 individuals (36,000 households). The negative binomial (NB) and the zero-inflated negative binomial (ZINB) models used for analysis, controlling for various potential confounders<br><br>Model appropriate for utilisation rate, takes into account of non-usage being high. Selection is not taken into account. | Compared with the uninsured the likelihood of hospital admission was higher among the insured and there was a positive effect on length of stay<br><br>Impact on the poor:<br><br>The average hospital admission rate for those aged 18 and younger with voluntary health insurance coverage exceeds the rate for the uninsured by 106% for those in the lowest two income quintiles and only by 36% for those in the richest quintile | - | - | - |
| Sun *et al.* (2009) | N= 6,147 rural households, | No consistent evidence of increased healthcare utilisation | The insured had lower catastrophic expenditure at | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| Country: China<br><br>Scheme: New Cooperative Medical System (NCMS) | including 3,944 individual chronic disease patients. Comparisons of proportions. No attempt to address selection | for chronic disease among insured and uninsured, as the chronic disease prevalence rate was higher among insured compared with non-insured | 40% threshold level (of non-food expenditure).<br><br>Impact on poor:<br><br>A greater proportion of NCMS members in the poorest quintile faced catastrophic expenditure as compared to those in the richest quintile | | |
| Yu *et al.* (2010)<br><br>Country: China<br><br>Scheme: New Cooperative Medical System (NCMS) | N= 22,636 individuals (6,147 households). Poisson and multivariate regression with SES and regional controls. Presence of adverse selection is tested by asking whether there is a difference between the perceived illnesses among the insured and non-insured. There is none, so no correction is made | No change in use of outpatient care services between those insured and not insured, regardless of income level and location. Inpatient admission rate higher among insured compared with non-insured in high-income group; no significant differences seen in middle- or low-income groups<br><br>NCMS members had a significantly higher inpatient admission rate than non-members in one province, while there was no significant difference between the two groups in the other region. One region showed higher length of stay for those insured<br><br>Impacts on the poor: | - | - | Qualitative finding: bribery had to be used to obtain reimbursements and hospitals would refuse admission for the insured because the NCMS scheme paid too little |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| | | No impact is found among the poor people across all the relevant outcomes | | | |
| Shi *et al.* (2010)<br><br>Country: China<br><br>Scheme: New Cooperative Medical System (NCMS) | N=11,252 (3,340 households). Logistic regression used to identify determinants of unmet needs for hospitalisation and of household impoverishment after reimbursement. Not clear what unmet needs or how that was measured | No significant impact on access to inpatient care | No significant evidence of protection against financial catastrophe (at the level of 40% of household capacity to pay) and household impoverishment (household income falling below poverty line due to medical expenses) | - | Fewer of the insured give financial reasons for not accessing care than the uninsured |
| **Community-based social health insurance schemes (CBHI or CHI)** | | | | | |
| **Identification criteria strongly met** | | | | | |
| Wang *et al.* (2009)<br><br>Country: China<br><br>Scheme: Rural Mutual Health Care (RMHC), a community-based health insurance scheme, introduced as a social | N= 1,925 households (1,173 in the intervention site and 752 in the control site).<br><br>The experiment used panel data both in the intervention and | - | - | RMHC has a positive effect on the health status of participants. Among the five dimensions of EQ-5D, RMHC significantly reduces pain/ | |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| experiment conducted in one of China's western provinces from 2003 to 2006. | control sites and the estimation method used here is difference-in-difference combined with propensity score matching. Measured health status using both a 5-point Categorical Rating Scale and the EQ-5D instruments | | | discomfort and anxiety/depression for the general population, and has a positive impact on mobility and usual activity for those over 55-years old<br><br>Impact on poor:<br><br>Positive, as the study did not find any statistically significant difference across different income groups | |
| Gnawali *et al.* (2009)<br><br>Country: Burkina Faso<br><br>Scheme: Community Based Health Insurance | Cross-section<br><br>Randomised step-wise clusters. Average treatment on the treated, averages weighted through propensity matching; the estimation recognises that uptake is too few to ignore selection effect. Sample too | Overall, there is a significant positive impact on healthcare utilisation: outpatient visits are higher; but no significant impact on inpatient care utilisation<br><br>Impact on the poor:<br><br>They are relatively less likely to utilise healthcare than richer people | The article states that the results are not valid to report due to sample size, as all results are reported by quartiles which themselves are very small | - | Poor are less likely to enrol in the schemes |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| | small. | | | | |
| Aggarwal (2010)<br><br>Country: India (in the state of Karnataka)<br><br>Scheme: Yeshasvini community-based health insurance programme, initiated by state government and run as a public-private collaborative insurance | N= 21,630 (4,109 households). Applied propensity score matching, offered non-parametric ATT measures on differences between the insured and uninsured<br><br>Subgroups are small, thus ignored | Health insurance increased the intensity and use of healthcare utilisation<br><br>Higher value for the insured with respect to: outpatient usage, frequency of consultation, frequency of surgery; with decline in use of government services for surgery and willingness to undergo surgery. Change in frequency of hospitalisation is not observed | Overall, health insurance reduced out-of-pocket health expenditure: Share of OOP expenditure in relation to total surgery expenditure is smaller; share of borrowing in total expenditure is smaller for households with insurance. The result is the reverse for inpatient service use, which is no higher for the insured | - | The effects are more pronounced on those health services that are directly covered under the programme |
| **Identification criteria moderately met** | | | | | |
| Devadasan *et al*. (2010)<br><br>Country: India<br><br>Scheme: Community-based health insurance run by NGOs | N=2,586 individuals (568 households). Panel survey of two matched cohorts followed up for 12 months. Logistic regression models were applied to control for SES factors as well as presence of minor, major or pre-existing conditions and distance to hospital. Selection was | Compared with non-members, CBHI members were more likely to be admitted to hospital for major ailments | - | - | Insurance status substantially determines utilisation of hospital services even allowing for adverse selection |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| | controlled by matching the groups by characteristics; no reduction on the dimension. Total hh used: 297 insured and 248 uninsured. | | | | |
| **Identification criteria not met** | | | | | |
| Jütting (2003)<br><br>Country: Senegal<br><br>Scheme: Several community-based health insurance schemes | N=2,900 (346 households). Logit and log-linear models were applied. Individual and community household characteristics controlled for | The insured had better access to healthcare services and were more frequently hospitalised compared with the uninsured | The insured incurred less out-of-pocket spending on healthcare treatment compared with uninsured | - | Several CBHI were facing financial problems due to inability of members to pay their fees<br><br>The very poor uninsured could not afford the premiums (religion and ethnicity played a role where sex and age did not). |
| Msuya *et al* (2004)<br><br>Country: Tanzania<br><br>Scheme: Community-based health | N = 1,700 (200 households). Chi square statistics and probit analysis applied | The insured are more likely to utilise healthcare<br><br>No significant impact of insurance on the use of | Though there are no significant differences between the insured and non-insured in the overall amount of health expenditure, the | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| insurance provision in rural areas, initiated by government of Tanzania | | preventive healthcare measures | insured are better financially protected against health shocks than non-insured people. The insured relied less on their own savings or selling food items etc. to pay for healthcare | | |
| Dror *et al.* (2006)<br><br>Country: Philippines<br><br>Scheme: Several community-based health insurance schemes run by government sponsored NGOs | N=10,189 individuals (1,953 households). Two-stage cluster with data for households pooled.<br><br>Dismiss selection: morbidities do not differ between the insured and uninsured, but chronic illness less prevalent in the uninsured group | Utilisation of health care was greater among the insured compared with the uninsured: insured had higher rates of visits to doctors in the previous 3 months and of deliveries attended by doctors | - | - | - |
| Smith *et al.* (2008)<br><br>Countries: Three West African countries: Senegal, Mali, and Ghana<br><br>Scheme: Several community-based health insurance | N=114,420 individuals (20,470 households) Logistic regression techniques were applied; SES factors were controlled for; 'dummy' variables to control for unmeasured | Increase in access to healthcare: compared with non-members, health insurance schemes with maternal health packages increased uptake of pre-natal services and hospitalised deliveries | After controlling for covariates, CBHI schemes with maternity benefit packages reduced expenditure on maternity services in Senegal and Ghana but not in Mali | - | - |

| Study | Type of study (study design and estimation) | Utilisation | Out-of-pocket health expenditure | Health outcome | Other information |
|---|---|---|---|---|---|
| schemes run by NGOs | differences. Attempts were made to 'subtract out' the portion of outcome differences to account for selection. No explanation as to how this works | | | | |
| Dror *et al.* (2009)<br><br>Country: India<br><br>Scheme: Several community-based health insurance schemes run by NGOs in two Indian states | Pune rural n=3,910 (808 households), Pune city n= 3,369 (700 households, Patna Bihar n=4,360 (700 households). T-tests or Anova used to calculate differences between insured and uninsured | The insured had greater use of the hospital than the uninsured. No significant observations seen in mean consultation (outpatient visits) per episode | Evidence of reasonable financial protection to the insured | - | - |

## 5.5. Evidence of impact on the poor

The extension of SHI to the non-formal sector and the poor has among its main purposes to support the poorest by increasing their health utilisation and decreasing costs of care. SHI or CBHI schemes generally target both the poor and non-poor in the informal sector, while a few target only the poor. The studies we examined in general report on the impact of all those targeted by the scheme; a few studies carry out further subgroup analyses by income gradient to capture the effects on the poorer groups.

We can confidently summarise the impact on the poor from 13 studies which fully meet the identification criteria. Seven studies reported from programmes that targeted just the poor. Six reported from programmes that were offered to everyone. The impact on the poor is summarised in Table 5.3, while Appendix 5.1 details each of the studies. Table 5.3 describes the study type according to whether it reports on insurance only for the poor or for the entire informal sector. We note how many studies reported improvement for everyone insured, for a subset of the poor or the poorest, and for no one insured.

**Table 5.3:** Summary of impact

| Insurance type and reported result | Utilisation | | OOP expenditure | | Health impact | |
|---|---|---|---|---|---|---|
| | Overall impact | On the poor/ poorest | Overall impact | On the poor/ poorest | Overall impact | On the poor/ poorest |
| *Insurance offered to only the poor* | | | | | | |
| Total = 13 | | | | | | |
| Improved | 7 | 1 | 7 | 1 lesser impact than for the non-poor | 1 | |
| No improvement | 4 | 1 | | | | 1 |
| Did not report | 2 | 5, (N/A for 6) | 5, unclear 1 | 6 | 11 | |
| *Insurance offered to all* | | | | | | |
| Total = 6 | | | | | | |
| Improved | | | | | 1 | 1 |
| No improvement | 3 | 1 worse | 3 | 1 | 2 | 1 |
| Did not report | 3 | 5 | 3 | 5 | 3 | 4 |

# 6. Discussion and conclusions

The insurance schemes reported in these studies differ widely; some even incorporated changes during staggered implementation (Wagstaff 2010; Wagstaff *et al*. 2009). Some targeted specific facility usage (Jowett et al. 2003). In this section, we summarise and offer suggestions to improve future studies.

## 6.1. Policy summary

Only an inconclusive summary can be offered. Enrolment seemed to be high in China and Egypt, at approximately at least 60 percent. The rates in Vietnam varied by region, but were high in most areas. Low enrolment was a problem for many of the schemes. The experiment by Thornton and Field (2010) offers an account as to how problematic enrolment can be. As education is positively related to adoption of insurance in the poorer countries, perhaps offering the beneficiaries a clear explanation of the insurance content would be helpful.

To answer the question posed by the title, we offer only ambiguous results. SHI does not always increase utilisation. This was clearly the case in Mexico (King *et al*. 2009) and in Georgia (Bauhoff et al. 2011). A different result comes from Mexico when restricted to those ill (Sosa-Rubi *et al*. 2009b). It is encouraging to see higher utilisation of preventive care when providers are given appropriate incentives (Miller *et al*. 2009). And at times, higher utilisation was accompanied by higher OOP expenditure, as in Wagstaff and Lindelow (2008). Similarly, Yip and Berman (2001) report higher utilisation rates across income class while reporting savings in OOP expenditure only for the middle class. Does an increase in utilisation serve to make patients more susceptible to undertaking medical expenditure in general? That may be so; of course, utilisation may also induce better health. We cannot say SHIs helped uniformly reduce OOP expenditure, nor can we say that it engendered higher utilisation. We found that both OOP expenditure and healthcare utilisation could be higher for the insured. Increase in utilisation, of course, may not be an indicator for better health.

We found that CBHI studies reported greater success, especially in those not rigorously conducted.

## 6.2. Strengths and weaknesses of the studies and the review

Considerable improvements in studies are needed. Most likely insurance schemes aimed at those outside the formal sectors will be offered on a voluntary uptake basis, even if targeted to an economic group. Evaluating these insurance schemes will require paying attention to identification issues. In this section, we report on recommended methodologies, the possibility of meta-analysis and also the methodological shortcomings of this review.

*Study methodology*: There are three types of impact evaluation possible, characterised by study design and estimation method. We assess them below:

1.     Usually insurance take-up is voluntary; and even if randomly assigned, some may not take up insurance fully. When selection is taken into account, randomisation itself can be the exogenous identifying factor for selecting insurance; and it is possible to calculate local average treatment effect or LATE (Angrist *et al*. 1996), in a similar way to the method adopted by King et al. (2009) and seen in Thornton and Field (2010). If baseline information is available, then factors such as attrition could be considered.

2. Many insurance schemes are offered in a non-experimental setting. There is the possibility that some areas/communities may be exposed to the opportunity of acquiring insurance and some may not be. If all areas are not exposed, then there is the possibility of matching people with insurance to similar types of people in the unexposed areas. This type of study is exemplified in Wagstaff *et al.* (2009) with baseline data. When the baseline is not present, Wagstaff (2007) offers a suitable approach. If people in all other areas are also exposed, then impact can be studied through some type of matching or instrumental variable methods using inverse mills ratio (Maddala 1983) for both selection and non-selection into insurance. We did not see this type of model in our study.

3. Use of RDD is possible when insurance is targeted. This usually yields ITT estimation and is suitable when enrolment is high, contrary to the situation found by Bauhoff *et al.* (2011) in their study of the scheme in Georgia.

No study, however, considered attrition problems. There is the further issue of making clear what the outcomes are and what type of outcomes are of interest. While utilisation rate is a clear measure, measures around impact on financial risk are not very straightforward, as our studies gave differing measures and none offered explanations for the particular value they adopted.

*Possibility of meta-analysis:* Meta-analysis is difficult without uniformity in outcome measures and methods for estimating effectiveness. Uniformity is not currently present in any of these factors. Thus, perhaps uniform policy requirements should be relaxed. SHIs or extended SHIs cannot be made uniform; they should fit the country and region. We should, however, be able to classify SHIs in useful ways. If policies can be appropriately classified, perhaps the relation between the types of policy and outcome can be examined. As the indicator for enrolment is an uncomplicated measure, this may be the first factor that can go through meta-analysis if SHI policy can be classified properly. We did not have enough SHI studies to attempt this. It may also be true that the policy makers in each country are interested in their own outcome indicators; thus, it may not be possible to expect uniform outcome measures.

*Shortcomings:* There are many shortcomings in the studies. As a result, the review does not offer a complete picture of the impact of SHI. The problems are enumerated below:

1. We did not report on the possibility that there may be excess usage of health care by the insured when payment to the provider is through a third party. None of our studies reported this type of issue, earlier described as moral hazard.

2. We did not report on whether or not the third party payers found ways to select out healthier patients, treat easier cases or exclude the most ill. This type of phenomenon, known as cream skimming/selection is noted above. This kind of study would require a different type of approach from the studies presented here.

3. Most of the studies we examined did not fully answer or even attempt to offer explanations for the results found. There were some speculations, for example: fee for services escalated the costs in the older Chinese scheme (Wagstaff and Lindelow 2008); misunderstanding of insurance affected enrolment rate (Thornton and Field 2010); the effect of bribery may have been to limited the reimbursement rate (Yu et al. 2010). No study linked features of insurance to any results.

4. The present review needs to turn to more qualitative accounts of the impact of insurance.

5. Clear methodological guidance on how to conduct a systematic review on the impact of programmes that induce identification problems in measuring the impact was not available. Guidelines available for systematic reviews in general do not address how selection problems in randomised studies should be addressed, nor do they address at all how to summarise impact studies conducted through non-experimental approaches. Identification problems are ubiquitous in social settings.

## 6.3. Non-scientific influence

We did not find any clear trends by author affiliations or funding sources in the impact analysis. The World Bank sponsored studies tended to address the identification problems more fully. We did find that the CBHI studies tended to report greater positive results than the SHI studies. CBHI studies tended to offer correction for selection at lower rates than did SHI studies. We also suspect that CBHIs may have placement or organisational biases. It may be that CBHIs are indeed being placed where they are more likely to succeed or are being run by groups dedicated to making them successful.

## 6.4. Checklist for policy makers and analysts

A proper evaluation of insurance must make sure that selection into insurance is taken into account if there is an element of voluntary enrolment. No study should be accepted as valid if it does not address the fact that in most circumstances, the uptake of insurance is a choice. Studies must report on the effectiveness of insurance in terms of its impact in the following ways:

1. Does the study report clearly on enrolment of insurance? Does it report on the factors that affect enrolment?

2. Does the study include the impact on those who are taking up the insurance (impact estimation known as average treatment on the treated (ATT) effect)? ITT estimations are appropriate when enrolment rates are high, especially if insurance is targeted.

3. Does the study recognise that those insured will select themselves into insurance? This factor is important because:

   a. The comparison group, if selection is not taken into account, is different from the insured; thus, the impact estimation is biased. This means that ATT would be a biased measure.

   b. If the ATT reported does not take into account selection, then the insurance effect reported would be muddled with other unobservable factors. The future takers of insurance when insurance becomes more widespread may experience a very different impact from the current users, as the latter may differ significantly from the future users, who may be more representative of the population.

4. Does the study correct for selection into insurance in recognisable way? Guides to this type of correction can be found for example in Khandker (2010).

5. Is the sample large enough so that institutionally the results would hold in the future? The example by King *et al*. (2009) is noteworthy. This factor differs from the issue around sample size which is justified

through the upholding of statistical power. Institutional factors may not easily be incorporated in sample size calculations.

6.    It is likely that if barriers to health care are beyond the actual cost of health care, the poorest may not take up insurance. Poor non-insured may underuse insurance for many reasons. Given that there is the possibility that the sample size may not be large enough to capture the impact on the poorest in nearly all our studies, studies should adopt innovative methods to measure the impact of insurance on the poorest. One method could be to oversample at baseline the users who are poor and receive very little or no health care.

7.    An important issue is substitution to higher level care or the use of insurance as subsidy to seek care in a more expensive setting. Wagstaff and Lindelow (2008) raised this issue, but more detailed examination would be helpful.

## 6.5. Recommendations

It is perhaps more important that projects are evaluated on a large scale than on a small scale. King *et al*. (2009), as the study was implemented by the Ministry of Health in Mexico, offer the possibility that government will carry out large-scale randomised studies. Administrative behaviour underlies the success of many programmes; heterogeneity in implementation would be captured in large studies. Although this review did not touch upon the administrative aspects of insurance schemes, it is possible that large-scale evaluations can capture aspects of feasibility of implementation of a large insurance project. For that reason, large studies should be encouraged.

Policy makers will have short-term horizons due to election cycles, and rapid implementation does not allow for careful assessment of policy. Yet policy is never implemented uniformly across regions (Duflo *et al*. 2008). This gives opportunities for evaluations to be carried out mostly at a non-experimental level by simply following the roll-out path of policy. We have seen that most of the studies we reviewed on SHI were non-experimental. The implementation period of two years was common in our SHI studies, and many had large samples. This may be too short. Bilateral agencies may not experience short-run political cycles. Large organisations such as the World Bank may be able to leverage large-scale pilot implementation and conduct rigorous impact studies.

Studies sponsored by the World Bank were of higher quality in general than other studies and conducted at a scale that might lead to some level generalisability. However, many of the studies originating from the efforts of the World Bank were conducted through data that were not particularly conducive to rigorous impact evaluation. Data need to be particularly suitable for evaluation purposes. In the longer run, the impact of insurance along with responsive health systems would be that health shocks are withstood by families at a much higher rate than some studies presently indicate. To test whether policies have achieved such impact, longitudinal studies would be needed.

A major problem found in our studies centres on measure of OOP expenditure. The welfare implications of many of these measures are not clear. A measure of 5 percent or 40 percent of income as catastrophic OOP expenditure does not have the same welfare implications for different income earners. A 40 percent reduction in household expenditure for the poor may entail near starvation for some families. One suggestion that is appealing is that insurance should protect people from high levels of expenditure, especially those who are poor. Simply examining the higher

end of the expenditure distribution for the insured and non-insured can be an interesting measure. How such distribution can be incorporated when selection into insurance is present is not clear. Protection from risk using some kind of decline in risk aversion can take income into account. Such measures may hold great promise, as this can serve as the dependent variable for each individual and be used in regression formulations as well as in propensity score matching exercise. Properties of such measures need to be clearly understood.

Many poor people may not make use of health care at all; this may be much more prevalent among those without insurance than those with insurance. Thus higher expenditure for the poor when insured may actually be an indication of a large increase in welfare. If only average OOP expenditure is measured, then it may not be very meaningful. Of course, if the OOP expenditure is large, then it has much clearer welfare implications. These possibilities indicate that much needs to be examined regarding the reasons why there may be no health expenditure for many of the uninsured. Surveys should probe into the reasons why no expenditure on health care was found for a family.

The project was made difficult by lack of standardisation in studies, as noted throughout this review. Although insurance schemes will differ across countries, a standardised rigorous set of guidelines to evaluate impact would benefit the policy community. It is perhaps incumbent upon the evaluation community to offer a set of standards on how to carry out non-experimental studies in order to achieve greater rigour and uniformity. Such standards would also help guide systematic reviews.

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# Appendices

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**Appendix 2.1: The theory and empirics of the impact of health insurance**

In this appendix, we first present a discussion of the selection problems. Then we discuss different estimation methods which measure the impact of insurance for the outcome of interest.

*A.2.1 Selection problem*

This section details two forms of selection problem and two issues surrounding the problem of moral hazard.

The selection problems arise due to actions by insurers and consumers to exploit unpriced risk heterogeneity and prevent pooling arrangements (Newhouse 1987), and the outcome of these actions can be adverse selection and/or cream selection.

*Adverse selection:* Following the general works in economics of information (Akerlof 1970; Miyazaki 1977; Rothschild and Stiglitz 1976;; Wilson 1979), it is well understood that the ability of consumers to conceal the true risk is an impediment in forming different types of insurance markets. People are aware of their own susceptibility to illness (some aspect of their own risk of becoming ill, e.g., high blood pressure), information they can withhold from a potential insurer.

If people could be distinguished according to their risk types, then a separate set of prices would be offered, as each group would be willing to pay different prices for health care and therefore, a different insurance premium, if they were offered this kind of price schedule. On the one hand, those with higher risk of becoming ill would find health insurance more attractive than those with a lower risk at any price below the actuarially fair price. On the other hand, insurers, when able to identify the healthy, would prefer to enrol those individuals at any price above the corresponding actuarially fair price (Jack, 1999, Morris *et al*. 2007). Healthier people would also prefer a low price and therefore would not sign on with any price set high. As the market can only offer a pooled or a single price for all involved, a low price would attract everyone but may fall short of an actuarially break-even price as the high risk people would drain the insurance funds. On the other hand, if the pooled price was high, it would attract mostly high-risk people, and there would be no risk sharing.

Due to asymmetric information on health status, insurers cannot distinguish people who are at low risk of health problems from those who are at high risk and therefore, adverse selection can arise. It is likely that those who select to be insured may have characteristics that give them a higher propensity to benefit from insurance than those who do not enrol (Wagstaff 2007). This is a situation of over-representation of high-risk people in the risk pool. Thus, there is no market price at which health care would operate to allow risk sharing among those facing low risk of ill health with those facing high risk (Jack, 1999, World Bank 1993). A health insurance market fails to exist in the sense that there cannot be a free exchange of goods and services that can be seen as health insurance. A straightforward way of preventing problems stemming from adverse selection is to mandate that everyone buys the specified HI coverage. Governments of many countries mandate SHIs in the formal sector to rectify this problem and subsidise the few who may be too poor to afford the actuarially fair price.

In developing countries, there have been recent attempts at offering voluntary insurance enrolment for the informal sector under a well-defined regulatory environment. Even at low prices or at zero cost, we see in many developing countries for SHI or CBHI (under the current regulatory environment in developing countries) that not all those who are eligible to enrol actually enrol. When

comparing the insured with the uninsured, we may conjecture that the insured may be fundamentally different from those not insured (Wagstaff 2007).

*Cream selections (cream skimming):* Insurance firms may have some choice regarding the people they enrol in many current health systems. A profit-motivated insurer may adopt the strategy of cream selection, a form of selection bias which is not due to asymmetry of information. Insurers may have an incentive to seek out the low-risk population subgroups and sell insurance to them. This may arise when insurers are able to identify subgroups of the population with different expected medical costs. Insurers can exclude the aged, people with previous illnesses or women. Regulatory frameworks can prevent cream skimming by prohibiting refusal to such high-risk groups. In our review, we did not encounter the problem of cream skimming in any of the insurance schemes.

## A.2.2 Moral hazard

Moral hazard (or unobservable action) in the case of health care refers to the likely behaviour changes of users and providers in terms of over-utilisation as well as over-provision of health care due specifically to health insurance coverage which allows healthcare bills to be partly or fully paid by a third party which does not provide or receive the services (Arrow 1963 Kotowitz 1987; Pauly 1968, 1974; Zeckhauser 1970).

*Demand-induced moral hazard*: This occurs: 1) when members of a health insurance plan consume more and expensive health care than they would have had they not joined; or 2) the provider over-provides healthcare since people have insurance coverage (Arrow 1965). Moral hazard arises because medical needs cannot be fully monitored, and insurance contracts are written on the basis of endogenously incurred expenses and not on the basis of health needs (Jack 1999). Under-insurance, the cost of acquiring care at the point of receiving care, is much below people's personal marginal valuation of care or the marginal production cost of this care. Patients may seek care often, and at times, marginal valuation may not correspond to any actual increase in health.

Moral hazard is generally considered as a welfare loss due to over-utilisation of resources (; Kotowitz 1987; Pauly 1968, 1974; Zeckhauser 1970). However, Nyman (2003) argued that the main motivation for purchasing insurance is the desire to gain access to those healthcare services that would otherwise be unaffordable. Since people in developing countries are already 'under-utilising' health care, the increase in uptake of healthcare utilisation is not considered a moral hazard but a 'welfare gain'.

*Supplier-induced moral hazard*: Arrow (1965) indicated that in all relations with health providers the patient may have significantly less information about what types of care are needed for a particular condition. As the insurer cannot observe the patient's health condition and the degree to which the provider only exerts efforts that are necessary, the provider can over-provide care. Depending on the payment structure, it is possible for healthcare providers to over-prescribe health care. Wagstaff and Lindelow (2008) conjecture that higher expenditure for an insurance scheme in China can be explained through provider fee-for-service payment mechanisms that were in place for the insurance schemes. Incentives associated with remuneration for services are a key factor in shaping the presence of supplier-induced moral hazard. Studies examined for this review did not address supplier-induced demand problems in relation to the specific insurance examined.

In summary, both selection problems and moral hazard issues generate difficulties in evaluating the impact of insurance. Some of the studies found in this review

tackle the problem of consumers who select themselves into insurance. The other issues did not receive much attention.

*A.2.3 Empirical factors*

This section discusses different empirical techniques for estimating outcome variables discussed in section A2.2 above.

*Enrolment:* Obtaining the determinants of enrolment is straightforward. It can involve either probit or logit regression methods for individuals offered the insurance with the dichotomous act of taking up HI as the dependent variable. For examining the determinants of enrolment at group or regional level, the ordinary least square method can be used. In the studies, functional forms for estimating the impact of various factors differ. It is likely that the level of income or expenditure may affect enrolment. There is a small likelihood that the same factors influencing enrolment, such as illness, could influence income or expenditure. In this case, there is the possibility of dual causality (endogeneity), with enrolment affecting income and income affecting enrolment.

*Utilisation:* Insurance effects can be estimated by a simple mean difference or through use of regression. Visits can be categorised as whether or not someone utilised a health clinic or some form of count integer value measure can be used, as opposed to a continuous measure for the number of times healthcare services were used; in these cases, the Poisson regression can be used, but where the mean is usually smaller than the variance, as would be the case with visits to health centres, a negative binomial regression method can be used in place of the Poisson regression. A further possibility is that many do not use health services at all within a given time period. A frequently practised method is the zero-inflated binomial method (ZINB) (Cameron and Trivedi 2005); another possibility is to use the data for only those reported sick in a given period (Jowett et al. 2004).

An ordered probit model can be used to differentiate the impact of insurance in utilisation of different types of provider or facility; the advantage of this type of model is to be able to take account of the comparability of the determining factors for the alternative choices (Wagstaff and Lindelow 2008). A multinomial model may also be used.

*Measuring financial protection:* Health expenditure is undertaken if there is an illness in the family and the individual chooses to use health services. In any survey there will be many who have not experienced any healthcare expenditure. Health expenditure is undertaken by a selected group; the explanation for the determinants of this expenditure will have to take this factor into account. One way of carrying this out is to examine the determinants of expenditure for only those who received care or self-reported sickness; another is to use a Tobit model, which takes into account only the selected group that underwent health expenditure (Sepehri et al. 2006a; Yip and Berman, 2001). There is the possibility that those uninsured are the poorest and cannot undertake any healthcare expenditure. They may also report that they were not ill when they actually were ill. In cases where the poor uninsured do not seek care at all, OOP expenditure among the insured can be higher at any given time. However, as OOP expenditure is always a financial burden, it should be worrisome that the insured incur this cost.

**Appendix 3.1: Search strategy**

The following websites were checked:

- the World Bank

- the World Health Organization WHOLIS database

- USAID

- Inter-American Development Bank

- Asian Development Bank

- Global Development Network

- OECD

- National Bureau of Economic Research (NBER

- the RAND Corporation

- McMaster University, Health Systems Evidence.

 The following conference proceedings were checked:

- 9th Annual International Conference on Health Economics, Management and Policy, 28 June to 1 July 2010, Athens, Greece

- 8th Annual International Conference on Health Economics, Management and Policy, 29 June to 2 July 2009, Athens, Greece

- 7th World Congress on Health Economics, 12-15 July 2009, Beijing, China

- Health Equity: Our Global Responsibility: 16th Annual Canadian Conference on International Health, 25-28 October 2009, Ottawa, Ontario.

Details of search strategies can be provided for these searches upon request:

- Database: Medline (on Ovid) 1950 to July 2010

- Database: EMBASE (on Ovid) 1980 to 2010 Week 27

- Database: Econlit (on Ovid) 1969 to June 2010 (database updated monthly, search undertaken 14 July 2010)

- ISI Web of Science

- The Cochrane Library (CENTRAL, EED and DARE)

- Cochrane EPOC Specialised Register (with thanks to Michelle Fiander, TSC EPOC Group)

- CAB Abstracts 1973 to 2010 Week 29.

## Appendix 3.2: Data abstraction form

| Name of reviewer | |
|---|---|
| ID Number, Author, Year and title | |
| Date Reviewed | |

*SECTION 1: Inclusion/exclusion*

| 1. Is this paper about social or community health insurance in developing countries? | *[included/excluded]* |
|---|---|
| 2. Does this paper report an evaluation study? | *[included/excluded]* |
| Reason(s) for exclusion | |

*SECTION 2: Characteristics of Included Study*

| Author(s) | | |
|---|---|---|
| Name(s): | | |
| Affiliation of the first author (state organisation) | | |
| Study | | |
| Year: | | |
| Objectives of the study: | | |
| Main research question: | | |
| **Study Design** | | *Description* |
| **1. Experimental:** | | *State if cluster or individual* |
| 1.1. RCT: Cluster or individual | *[Yes/No/Unclear]* | |
| 1.2. Step wedged | *[Yes/No/Unclear]* | |
| 1.3. Quasi-Experimental | *[Yes/No/Unclear]* | |
| i. Propensity score matching method | *[Yes/No/Unclear]* | |
| ii. Other | ………….. | |
| 1.4 Other: | ………………….. | |
| **2. Observational:** | | |
| 2.1. Cohort study | *[Yes/No/Unclear]* | |
| 2.2.Cross sectional (Survey) | *[Yes/No/Unclear]* | |

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| | | |
|---|---|---|
| 2.3. Interrupted time series Studies | *[Yes/No/Unclear]* | |
| 2.4. Pre-post differences study | *[Yes/No/Unclear]* | |
| 2.5. Differences in differences studies | *[Yes/No/Unclear]* | |
| 2.6. Case Studies | *[Yes/No/Unclear]* | |
| 2.7 . Controlled before and after study | *[Yes/No/Unclear]* | |
| 2.8. Other: | ………………….. | |

| Duration (years and months) | |
|---|---|
| 1. Duration between implementation of the scheme and evaluation of the study | |
| 2. Duration of the study | |

| Participants | Participant Group | Comparator Group |
|---|---|---|
| 1.Location of study | | |
| 2. Number of participants | | |
| 3. Number of clusters | | |
| 4. Mean age: range ± SD | | |
| 5 Sex: % of male | | |
| 6. SES: Income, vulnerable social groups –please state | | |
| 7. Occupational status: please state | | |
| 8. Rural-Urban status: please state | | |

| Characteristics of Comparison Group | |
|---|---|
| 1. What is the comparison group? | |
| 2. Do they have access to free or subsidised public healthcare? (describe) | |
| 3. Do they have access to any other healthcare that is free or subsidised? (describe) | |

| Intervention | |
|---|---|
| **Characteristics of Health Insurance Programme**<br><br>*SHI type* | |
| 1.1 Government or community based | …………………… |
| 1.2 Compulsory or Voluntary | ……………………… |
| 1.3 Fully or partially or not subsidized | ……………………. |
| 2.Geographical Coverage (National or Regional) | ………………………… |
| 3. Target beneficiaries (General population or specific population groups) | ………………………….. |
| **4. Component of Health Insurance Package** | |
| 4.1 Primary care with OP/IP care (describe) | ……………………………. |
| 4.2 Secondary level care with OP/IP care (describe) | ………………………………… |
| 4.3 Tertiary level care with OP/IP care (describe) | …………………………….. |
| 4.4 Maternity and child health (describe) | ………… |
| 4.5 Other | …..… |
| **5. Types of healthcare facilities** | |
| 5.1 Private healthcare facilities | *[Yes/No/Unclear]* |
| 5.2. Public healthcare facilities | *[Yes/No/Unclear]* |

| | | |
|---|---|---|
| 5.3. Voluntary/Charity healthcare facilities | *[Yes/No/Unclear]* | |
| 5.4. Mix of public-private-charity | *[Yes/No/Unclear]* | |
| 5.5. Other (describe) | ………………………….. | |
| 5.6 Level of insurance coverage – please state | …………………………… | |
| **6. Financing and service delivery** | | |
| 6.1 Co-payment (describe whether the scheme has co-insurance, deductibles etc.) | *[Yes/No] and describe* .......................................................... | |
| 6.2 HMO model | *[Yes/No/Unclear]* | |
| 6.3 Third party payment | *[Yes/No/Unclear]* | |
| 6.4 Other (describe) | …………. | |
| Outcomes | | Description of outcome Indicators |
| 1.Primary Outcome/s<br><br>1.1. Health outcomes<br><br>i) incidence of morbidity<br><br>ii) incidence of mortality<br><br>1.2. Access to healthcare/Healthcare utilisation<br><br>i) Access to primary healthcare<br><br>ii) Access to secondary healthcare<br><br>iii) Access to tertiary healthcare<br><br>1.3. Consumption Smoothing<br><br>(Out-of-pocket expenditure per episode of illness or expenditure as a share of income (recognising to the extent they can be | *[Yes/No/Unclear]* | Explain measure used with outcomes: |

| | | |
|---|---|---|
| classified as catastrophic) | | |
| 2.Intermediary Outcome | | |
| 2. 1. Enrolment rate | | |
| 3. Secondary outcomes/s: | | |
| 3.1 Self perceived health status/quality of life | | |
| 3.2 Patient satisfaction | | |
| 3.3 Health expenditure | | |
| 4. Other relevant outcomes if any (include even if not directly relevant to our context): | | |
| Policy | | |
| 1.Did the authors make any policy recommendations? | *[Yes/No/Unclear] If 'yes', please list them* | |
| 2. Were there any unintended consequences? | *[Yes/No/Unclear] If 'yes', please list them* | |

*SECTION 3: Economic Threats to Validity*

| | |
|---|---|
| **1. Enrolment:** (Did the study make adjustment for Adverse selection- a situation of more unhealthy people joining the SHI scheme which in turn can result in higher utilization of healthcare (more OP visit, more hospitalisation) considered as a positive impact of SHI?) | ………………………. |
| **2. Utilization of healthcare (**Did the study make adjustment for Moral Hazard – either or both supplier and/or consumer induced moral hazard effect of SHI? That is, unnecessary and over utilization of healthcare due to health insurance coverage) | ………………………. |
| **3. Sample Size:** Power calculation considered? | *[Yes/No/Unclear]* |
| **4. Heterogeneity:** Are the following sub group effects considered? 1. Age group 2. Ethnicity 3. Women 4. Socio-economic status 5. Geographically remote areas 6. Other | *[Yes/No/Unclear]* |

| | ............. |
|---|---|
| **6. Correction of statistical errors (if 'yes' describe)** | |
| i) Did they correct for regional or subgroup in cluster data? | *Regional - [Yes/No/Unclear]*<br><br>*Subgroup - [Yes/No/Unclear]* |
| ii) Did they take in to account serial autocorrelation in time series data? | *[Yes/No/Unclear]* |
| iii) Did they use robust standard errors such as Huber-White statistics? | *[Yes/No/Unclear]* |

*SECTION 4: Risks of Bias Assessment for Studies*

***4.1 Quality Assessment for Quantitative Studies (Ref: Effective Public Health Practice Project (EPHPP): Quality Assessment Tool for Quantitative Studies)[3]***

| A | **SELECTION BIAS** | |
|---|---|---|
| (Q1) | Are the individuals selected to participate in the study likely to be representative of the target population? | 1. Very likely<br>2. Somewhat likely<br>3. Not likely<br>4. Can't tell |
| (Q2) | What percentage of selected individuals agreed to participate? | 1. 80 – 100% agreement<br>2. 60 – 79% agreement<br>3. less than 60% agreement<br>4. Not applicable<br>5. Can't tell |
| RATE THIS SECTION<br><br>See dictionary | STRONG    MODERATE    WEAK<br><br>1          2          3 | |
| **B)** | **STUDY DESIGN** | |
| | Indicate the study design<br><br>1. Randomized controlled trial<br><br>2. Controlled clinical trial<br><br>3. Cohort analytic (two group pre + post)<br><br>4. Case-control<br><br>5. Cohort (one group pre + post (before and after))<br><br>6. Interrupted time series<br><br>7. Other specify _____<br><br>8. Can't tell | |

---

[3] National Collaborating Centre for Methods and Tools (2008). *Quality Assessment Tool for Quantitative Studies Method*. Hamilton, ON: McMaster University. (Updated 13 April, 2010). Retrieved from http://www.nccmt.ca/registry/view/eng/15.html.

| (Q1) | Was the study described as randomized? If NO, go to Component C. | 1. Yes<br>2. No | | |
| (Q2) | If Yes, was the method of randomization described? (See dictionary) | 1. Yes<br>2. No | | |
| (Q3) | If Yes, was the method appropriate? (See dictionary) | 1. Yes<br>2. No | | |
| RATE THIS SECTION<br>See dictionary | | STRONG<br>1 | MODERATE<br>2 | WEAK<br>3 |
| **C** | **CONFOUNDERS** | | | |
| (Q1) | Were there important differences between groups prior to the intervention? The following are examples of confounders:<br>1. Race<br>2. Sex<br>3. Marital status/family<br>4. Age<br>5. SES (income or class)<br>6. Education<br>7. Health status<br>8.Pre-intervention score on outcome measure | 1. Yes<br>2. No<br>3. Can't tell | | |
| (Q2) | If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?<br>    1. 80 – 100% (most)<br>    2. 60 – 79% (some)<br>    3. Less than 60% (few or none)<br>    4. Can't Tell | | | |
| RATE THIS SECTION<br>See dictionary | | STRONG<br>1 | MODERATE<br>2 | WEAK<br>3 |
| **D)** | **BLINDING** | | | |
| (Q1) | Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants? | 1. Yes<br>2. No<br>3. Can't tell | | |
| (Q2) | Were the study participants aware of the research question? | 1. Yes<br>2. No<br>3. Can't tell | | |
| RATE THIS SECTION<br>See dictionary | | STRONG<br>1 | MODERATE<br>2 | WEAK<br>3 |
| **E)** | **DATA COLLECTION METHODS** | | | |
| (Q1) | Were data collection tools shown to be valid? | 1. Yes<br>2. No<br>3. Can't tell | | |
| (Q2) | Were data collection tools shown to be reliable? | 1. Yes<br>2. No<br>3. Can't tell | | |
| RATE THIS SECTION<br>See dictionary | | STRONG<br>1 | MODERATE<br>2 | WEAK<br>3 |

| F) | WITHDRAWALS AND DROP-OUTS | |
|---|---|---|
| (Q1) | Were withdrawals and drop-outs reported in terms of numbers and/or reasons per group? | 1. Yes<br>2. No<br>3. Can't tell<br>4. Not Applicable (i.e. one time surveys or interviews) |
| (Q2) | Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest). | 1. 80 -100%<br>2. 60 – 79%<br>3. less than 60%<br>4. Can't tell<br>5. Not Applicable (i.e. Retrospective case-control) |

| RATE THIS SECTION | | STRONG | MODERATE | WEAK |
|---|---|---|---|---|
| See dictionary | | 1 | 2 | 3 |

| G) | INTERVENTION INTEGRITY | |
|---|---|---|
| (Q1) | What percentage of participants received the allocated intervention or exposure of interest? | 1. 80 -100%<br>2. 60 – 79%<br>3. less than 60%<br>4. Can't tell |
| (Q2) | Was the consistency of the intervention measured? | 1. Yes<br>2. No<br>3. Can't tell |
| (Q3) | Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results? | 1. Yes<br>2. No<br>3. Can't tell |

| H) | ANALYSES | |
|---|---|---|
| (Q1) | Indicate the unit of allocation (circle one)<br>community organization/institution practice/office individual | |
| (Q2) | Indicate the unit of analysis (circle one)<br>community organization/institution practice/office individual | |
| Q3) | Are the statistical methods appropriate for the study design? | 1. Yes<br>2. No<br>3. Can't tell |
| (Q4) | Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received? | 1. Yes<br>2. No<br>3. Can't tell |
| | **GLOBAL RATING COMPONENT RATINGS**<br>**[reviewers are asked to carry across their ratings for the categories above]** | |

| SELECTION BIAS | STRONG=1 | MODERATE=2 | WEAK=3 |
|---|---|---|---|
| STUDY DESIGN | | | |
| CONFOUNDERS | | | |
| BLINDING | | | |
| DATA COLLECTION METHOD | | | |
| WITHDRAWALS AND DROPOUTS | | | |

| GLOBAL RATING FOR THIS PAPER (circle one): | |
|---|---|
| 1 STRONG (no WEAK ratings) | |

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| | |
|---|---|
| 2 MODERATE (one WEAK rating) <br><br> 3 WEAK (two or more WEAK ratings) | |
| **With both reviewers discussing the ratings:** | |
| Is there a discrepancy between the two reviewers with respect to the component (A-F) ratings? <br><br> No/Yes <br><br> 1 Oversight <br><br> 2 Differences in interpretation of criteria <br><br> 3 Differences in interpretation of study | If yes, indicate the reason for the discrepancy |
| <u>Final decision of both reviewers (circle one):</u> <br> 1 STRONG <br> 2 MODERATE <br> 3 WEAK | |

### *4.2 Qualitative studies- (Ref: CASP tool)[4]*

| | | |
|---|---|---|
| **Type of qualitative study** | Participant observation | *[Yes/No/Unclear]* |
| | Open ended interviews | *[Yes/No/Unclear]* |
| | Structured interviews | *[Yes/No/Unclear]* |
| | Please state other | ………….. |
| **Was there a clear statement of the aims of the research?** | In terms of <br><br> a) goal of the research <br> b) its relevance | *[Yes/No/Unclear]* <br><br> *[Yes/No/Unclear]* |
| **Is a qualitative methodology appropriate?** | Does the research seeks to interpret or illuminate the actions +/or subjective experiences of participants | *[Yes/No/Unclear]* |
| **Is a theoretical perspective given** | e.g. grounded theory (Please state) | |
| **Sampling** | Is the sampling strategy appropriate to address its aims? | |
| | Is it clearly described where <br><br> a) sample was selected from <br> b) why setting was chosen <br> c) who was selected <br> d) how sample was selected <br> e) sample size justified | *[Yes/No/Unclear]* <br> *[Yes/No/Unclear]* <br> *[Yes/No/Unclear]* <br> *[Yes/No/Unclear]* <br> *[Yes/No/Unclear]* |

---

[4] http://www.sph.nhs.uk/sph-files/casp-appraisal-tools/Qualitative%20Appraisal%20Tool.pdf

| | | |
|---|---|---|
| **Incomplete data** | No + % of drop-outs for intervention group<br><br>Reasons for drop out:<br><br>No + % of drop-outs for control group<br><br>Reasons for drop out:<br><br>Incomplete outcome data addressed? | |
| **Data collection** | Were the data collected in a way that addressed the research question? Is it clear:<br><br>a) where setting of the data collection was chosen<br>b) why the setting was chosen<br>c) that study objectives were explained to participants<br>d) how data was collected<br>e) how data was recorded<br>f) who collected the data<br><br><br>Were the methods modified during data collection | *[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br><br>*[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br><br>*[Yes/No/Unclear]* |
| **Data analysis** | Was data analysis sufficiently rigorous. Is it clear<br><br>a) How analysis was done<br>b) How themes categories were derived from data<br>c) Method of analysis explained<br>d) That results were fed back to participants<br>e) Was triangulation used<br>**f)** Was analysis repeated to ensure reliability by different researcher | *[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]* |
| **Research partnership relations** | Is it clear that researchers critically examined:<br><br>a) their own role<br>b) Potential influence<br>Was relationship between researchers+participants considered? | *[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]*<br><br>*[Yes/No/Unclear]* |
| **Findings** | a) Is it possible to summarize the findings?<br>b) Where the findings made explicit?<br>c) Were the findings easy to understand?<br>d) Are key concepts presented?<br>**e)** Is the interpretation clearly presented? | *[Yes/No/Unclear]*<br>*[Yes/No/Unclear]*<br>*[Yes/No/Unclear]*<br>*[Yes/No/Unclear]*<br>*[Yes/No/Unclear]* |
| **Justification of the data interpretation** | a) Was all the data taken into account?<br>b) Are quotes numbered/identified?<br>c) Do authors explain how data was selected from original sample?<br>d) Do authors indicate links between data presented and their own interpretation of the data?<br>e) Are negative, unusual or contradictory | *[Yes/No/Unclear]*<br>*[Yes/No/Unclear]*<br>*[Yes/No/Unclear]*<br><br><br>*[Yes/No/Unclear]* |

| | | |
|---|---|---|
| | cases presented? <br> f) Is there adequate discussion of the evidence both for and against authors own interpretation? | *[Yes/No/Unclear]* <br><br> *[Yes/No/Unclear]* |
| **Transferability** | a) Is there conceptual and theoretical congruence between this and other works? <br> **b)** Are the findings transferable to another population? | *[Yes/No/Unclear]* <br><br> *[Yes/No/Unclear]* |
| **Relevance and usefulness** | How important are the findings to practice? | |

**Section 5. Conclusion from the study**

| | |
|---|---|
| **Major Findings:** | |

## Appendix 5.1: Evidences of impact on poor

(Studies meeting the identification criteria and reporting on the poor)

| Study | Utilisation | Out-of-pocket health expenditure | Health outcome |
|---|---|---|---|
| Wagstaff *et al* (2009)<br><br>Country: China<br><br>Scheme targets both poor and non poor of informal sector | Overall, significant impact on utilisation.<br><br>NCMS has apparently had a larger impact among the poor in the use of outpatient care at village and township levels, and a smaller impact on the use of outpatient facilities at county hospital level. The impact is smaller for those who are poorer, significantly for inpatients spells and by type of facilities. | Overall, out-of-pocket payments have not been reduced.<br><br>Out-of-pocket spending impacts were less pronounced among the poorest 20%. NCMS has produced a smaller reduction in the cost of deliveries among the poor than among the rich, and a smaller increase in out-of-pocket spending on other items. | - |
| Wang *et al.* (2009)<br><br>Country: China<br><br>Scheme targets both poor and non-poor of informal sector | - | - | Overall, scheme had a positive effect on the health status of participants.<br><br>There is positive impact on the poor too as the result did not find any statistically significant difference across different income groups. |
| Wagstaff (2007)<br><br>Country: Vietnam<br><br>Scheme (VHCFP) mainly for the poor of informal sector | VHCFP has increased both outpatient and inpatient utilisation.<br><br>Negligible impacts on utilisation among the poor deciles.<br><br>Richer groups (>20%-tile income holder) had higher outpatient and (>10%) inpatient utilisation. | VHCFP has not reduced average out-of-pocket spending but has reduced the risk of catastrophic spending.<br><br>Lower income insured group (<20 percentile income holders) experienced less catastrophic payments. | - |
| Jowett *et al.* (2004)<br><br>Country: Vietnam<br><br>Scheme targets both poor and non-poor of informal sector (voluntary | Overall, the insured patients are more likely to use outpatient facilities and public providers.<br><br>The insured patients from the lower income levels are more likely to use outpatient facilities and public providers. | - | - |

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| | | | |
|---|---|---|---|
| component of Vietnam's health insurance) | | | |
| Gnawali *et al.*(2009)<br><br>Country: Burkina Faso<br><br>Scheme: Community-based health insurance of informal sector | Overall, there is a significant positive impact on healthcare utilisation: Outpatient visits are higher, but no significant impact on inpatient care utilisation.<br><br>The poor are relatively less likely to utilise healthcare than richer people. | Due to sample size, the study did not report the results. | - |

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