



# Impact of an Integrated Social Health Protection Scheme in Kampot, Cambodia 2008 to 2010



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Protection Scheme in Kampot, Cambodia**  
2008 to 2010

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# List of Acronyms

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AFD	Agence Française de Développement (French Agency for Development)
BASIS	USAID agricultural research grant project
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GRET	Groupe de Recherche et d’Echanges Technologiques
IE	Impact evaluation
IV	Instrumental variable
KfW	Kreditanstalt für Wiederaufbau
KHR	Khmer riel (KHR 4,000 = USD 1.00)
MOH	Ministry of Health
OD	Operational [health] district
OOP	Out-of-pocket expenditure
SHPP	Social Health Protection Project

# Acknowledgements

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This report was produced for the Social Health Protection Project (SHPP), one of the technical modules of the Cambodian-German Social Health Protection Programme, supported by the German Federal Ministry for Economic Cooperation and Development (BMZ) and in partnership with the Ministry of Health of the Royal Government of Cambodia. The objective of the programme is that ‘access of the poor and vulnerable to effective and affordable quality health care is improved and the services are increasingly used by the population’.

The programme is implemented through the two main German cooperation agencies: the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the Kreditanstalt für Wiederaufbau (KfW). Both implementing agencies run specific programme modules; GIZ is in charge of the technical cooperation, and KfW supports the financial cooperation.

This report is based on the results of a larger research project examining the overall effects of Sokhaphheap Krousar Yeung (SKY, literally ‘Health for Our Families’) micro health insurance programme, and which was extended to Kampot province with the support of GIZ. Primary data and documentation for the analysis underlying this report were provided by the SKY impact evaluation project ([www.skyie.org](http://www.skyie.org)), which was funded by the Agence Française de Développement (AFD) and BASIS. This impact evaluation was implemented by the University of California, Berkeley (UC Berkley), and Domrei Research and Consulting.

The original report by Domrei Research and Consulting was commissioned in 2011. Its methods are based on the collaborative work of Professor David Levine and Rachel Polimeni, both from UC Berkeley, and Ian Ramage from Domrei Research and Consulting. The syntax files used to create the datasets for the instrumental variable estimations and the instrumental variable analysis were written by Rachel Polimeni and Francine Chimma Anene. The analysis was processed by Kristine Nilsen, and the report was finalised under the supervision of Ian Ramage.

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# Executive Summary

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In collaboration with the Cambodian Ministry of Health (MOH), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) is implementing the technical module of the Cambodian-German Social Health Protection Programme funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) to improve the access of the poor and vulnerable to effective and affordable health care, and increase utilisation of services.

In the framework of the German technical cooperation, GIZ implements the Social Health Protection Project (SHPP). The first phase of SHPP started in 2009 following the closure of a previous programme supported by BMZ: the Health Sector Support Programme. SHPP supports three out of five strategic areas of Cambodia's second Health Strategic Plan 2008-2015, namely improvement of health care services, health care financing and health system governance. In the area of health care financing, the project aims at extending social health protection (SHP) mechanisms in Cambodia by providing technical assistance and policy advice at national and provincial level. In particular, the project supports the development of SHP schemes in the provinces of Kampot and Kampong Thom.

In Kampot operational health district (OD), GIZ supported the non-governmental organisation Groupe de Recherche et d'Echanges Technologiques (GRET) in the development and implementation of a subsidised micro health insurance from 2007 until 2012. The scheme operated under GRET's Cambodian micro health insurance programme, Sokhaphheap Krousar Yeung (SKY)<sup>1</sup>. It provided fully-subsidised coverage for pre-identified poor households, and voluntary enrolment for vulnerable and near-poor households based on prepaid contributions. Pre-identified poor households were exempted from contributions, could access public health services free-of-charge and benefited from additional direct non-medical benefits such as transportation to health facilities. Social, i.e. direct non-medical, benefits were partly financed by the community and managed by faith-based organisations. The present analysis only looked at voluntarily enrolled members of the scheme.

Domrei Research and Consulting and the University of California, Berkeley, conducted a longitudinal impact evaluation (IE) of SKY micro health insurance in Kampot, Kandal and Takeo provinces from 2008-2011. Through secondary analysis of data collected during this evaluation, the present report attempts to document the health and economic impacts of the micro insurance scheme in Kampot OD, one of the two provinces where GIZ provides technical support.

## Summary of Findings

While scheme members in Kampot OD were more likely to experience an illness just before joining, compared to households who never became members, the difference was not statistically significant at the 95% confidence level. However, member households were significantly more likely to have a household member in self-reported poor health ( $P < 0.05$ ).

After initially joining the insurance scheme, a large proportion of members dropped out over the following 18 months, with considerable decreases after six and 12 months (coinciding with the dates of contract renewal). The dropout rate of scheme members in Kampot OD was lower than in SKY schemes in Kandal and Daun Keo ODs (in Kandal and Takeo provinces, respectively).

In total, 44.8% of households experienced at least one health shock in the 12 months preceding the baseline survey. The incidence rate of health shocks in Kampot OD was lower than two other ODs studied - Ang Rokar OD (Takeo province) and Kandal OD - and slightly higher than Daun Keo OD.

None of the variables tested through instrumental variable (IV) analysis showed statistically significant differences (at the 95% confidence level) between the treatment and control groups in Kampot OD.

1 In English, 'Health for Our Families'.

In a separate report on the evaluation of SKY micro health insurance,<sup>2</sup> many significant differences between the treatment and control groups were found using IV analysis. However, when applying the same methodology to the Kampot OD sample, statistically significant differences between these groups could not be found. This is most likely due to the limited sample size in Kampot. Therefore, the following analysis does not yield many statistically conclusive statements about the health and socioeconomic impacts of micro health insurance (see the limitations section of the methodology for more details). Therefore, the reader is referred throughout the report to the overall findings in the SKY IE report (Levine et al 2011), used to infer interpretation of the results of the analysis on the Kampot OD sub-sample.

The Levine et al report many significant differences between the treatment and control groups using IV analysis. The following statistically significant differences were found when looking at the whole sample:

- Scheme members were more likely to have a health shock treated at a public health facility, and less likely to be first treated at a drug seller, private doctor and/or a private health care facility.
- Scheme members overall spent less on health care than non-members. Specifically, they were less likely to have expenditures greater than USD 250, and they had lower costs when they did seek private care. Members were also less likely to pay for the costs associated with health shocks through sales of assets and taking out loans with interest.
- Micro health insurance coverage also had a positive impact on debt; on average, scheme members had USD 70 less debt, and a lower total value of all health-related loans.
- Micro health insurance membership significantly increased trust in the scheme. However, it did not have a statistically significant impact on trust in public doctors.

<sup>2</sup> See Levine et al (2011).

# Introduction

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The Royal Government of Cambodia's Health Strategic Plan 2008-2015 (HSP2) aims to ensure improved and equitable access to, and utilisation of, essential-quality health care and preventative services, with particular emphasis on women, children and the poor. Within this framework, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), in collaboration with the Cambodian Ministry of Health (MOH), is implementing the technical modules of the Cambodian-German Social Health Protection Programme (funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) to improve the access of the poor and vulnerable to effective and affordable health care, and increase utilisation of services. Through Social Health Protection Project (SHPP), social protection measures to meet the health care needs of the poorest and most vulnerable groups are supported in a number of provinces through various schemes, including subsidised micro health insurance, voluntary enrolment in health equity funds (HEF), and vouchers for reproductive health (implemented under a financial cooperation module through the KfW Entwicklungsbank (KfW)).

In Kampot operational district (OD), GIZ supported the Groupe de Recherche et d'Échanges Technologiques (GRET) in the development and implementation of a micro health insurance programme between 2007 and 2012. The scheme operated under this programme was called Sokhapheap Krousar Yeung (SKY; 'Health for Our Families'). It provided fully-subsidised coverage for pre-identified poor households, and voluntary enrolment for vulnerable and near-poor households based on prepaid contributions. Pre-identified poor households were exempted from contributions, could access public health services free-of-charge and benefited from additional direct non-medical benefits such as transportation to health facilities. Social, i.e. direct non-medical, benefits were partly financed by the community and managed by faith-based organisations. The present analysis only looked at voluntarily enrolled members of the scheme.

From 2008 to 2011, Domrei Research and Consulting, in collaboration with the University of California, Berkeley, conducted a longitudinal impact evaluation (IE) of SKY micro health insurance in Kampot, Kandal and Takeo provinces. The objectives of the impact evaluation were:

- to estimate the impact of the SKY programme on health care utilisation, health and economic outcomes;
- to understand the determinants of health insurance uptake;
- to identify the potential effects of health insurance on public health care facilities;
- to contribute to the body of knowledge on micro health insurance in developing countries.

This report documents the impact of the German-supported micro insurance scheme on voluntary members in Kampot OD, in Kampot province, through a secondary analysis of the data collected during the SKY IE in Cambodia.

## Research Questions

This report attempts to respond to the following main research question:

- What are the impacts of micro health insurance on the socioeconomic and social protection situations of members in Kampot OD?

Secondary research questions include:

- What are the determinants of health insurance uptake and retention among interest groups covered by the scheme?
- What was the effect of the scheme on health-seeking behaviour, and how did this differ from interest groups and other provinces covered in the SKY IE, in particular on the level and type of utilisation of health services, coping strategies and provider preferences?

- How did the coverage provided by scheme impact the determinants of health service utilisation, in particular on factors identified as barriers to access?
- What were the levels and frequencies of health-related expenditures (e.g. transportation) among interest groups, both direct and indirect (opportunity costs and debt)?
- What were the incidence rates and levels of health shocks among interest groups covered by the scheme?
- What was the protective effect of the scheme on catastrophic health expenditures, health-related debt, and loss of economic productivity in Kampot OD?
- How did the effect of micro health insurance in Kampot OD differ from other geographic areas covered by SKY?

# Methods

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## Survey Design

The impact evaluation of SKY micro health insurance was a longitudinal, randomised control trial conducted in three provinces (four operational districts) over two rounds: a baseline survey conducted in 2008 and a follow-up survey conducted in 2009.

Those who choose to purchase health insurance typically differ markedly from those who decline insurance. To understand the effects of insurance, a randomised control trial was implemented. This allowed us to identify the impact of health insurance independently from other factors that may affect a household's decision to enrol in insurance. No household was denied access to insurance. Rather, by subsidising the premium of a randomly selected group of households, the effect of the insurance on households could be estimated without substantially altering the existing micro insurance programme.

In total, 245 villages were surveyed (including 33 villages in Kampot OD) where micro-insurance was introduced for the first time from December 2007 – October 2008. This was achieved through several steps. First, village meetings were conducted in each location by SKY staff, and lucky draws (lotteries) were held to randomly assign households into one of two groups, with households either receiving a low- or high-value discount coupon for micro health insurance.<sup>3</sup> Several months later, the research team visited all high-value coupon holders and a subset of low-value coupon holders and asked about a range of health and socioeconomic topics. One year later, the same households were administered the follow-up survey to monitor and measure any changes in their health, health-seeking behaviour and socioeconomic status.

3 Low-value coupons were the standard offer of one month free in the first six-month cycle. High-value coupons gave households five months of free insurance in the first six-month cycle, and three free months in the second six-month cycle.

The overall randomisation of the sample for the SKY survey was tested by comparing findings of selected variables such as age, sex and educational attainment, to findings of the rural sample of the Cambodian Demographic Health Survey (CDHS) 2005, a nationally representative survey. The results of these comparisons demonstrate very few differences between the surveyed sample and the CDHS sample. The randomisation of the sample instrument (through low and high-value coupons) was examined through clustered t-tests. Of 30 variables tested, only two – lowest ranked wealth group by enumerator ( $p < 0.01$ ), and house made of palm fronds ( $p < 0.05$ ) – were significantly different between the high and low coupon samples.<sup>4</sup>

## Data Collection

Data collection for the baseline survey was conducted from July to December 2008. Data collection for the follow-up survey was conducted from July 2009 to January 2010. One team of seven people (one field supervisor, one data editor, four interviewers and one anthropometric measurer) conducted the fieldwork in Kampot OD in each round of data collection. The survey team received five days of fieldwork training, during which the instrument was also pre-tested under real field conditions.

## Research Instrument

The final instrument used for the baseline and follow-up surveys was designed by Domrei Research and Consulting, together with the University of California, Berkeley. The survey was designed to measure household background characteristics, assets, health-related debt, health shocks, preventive care, and trust and satisfaction in both the micro health insurance and public health care providers. In addition, the instrument aimed to gather anthropometric data, to measure wasting and stunting among children less than five years old.

4 See Levine et al (2011).

Table 1: Results of the baseline and follow-up household surveys in Kampot OD (excluding additional sample).

Sample structure	Type of coupon		Total
	High-value	Low-value	
Randomised by coupon status	346	341	687
<b>Baseline</b>			
Interviewed	341	333	674
Completed interviews	341	331	672
Completed interviews (%)	98.6%	97.1%	
Bought insurance	41.9%	7.3%	170
<b>Follow-up</b>			
Completed interviews (%)	94.5%	94.1%	648

There were eight sections included in the instrument:

Section 1: Respondent background

Section 2: Household member list

Section 3: Household assets

Section 4: Health shocks

Section 5: Maternal and child health

Section 6: Trust and satisfaction

Section 7: Selection into insurance

Section 8: Child immunisation

The instruments used in the baseline and follow-up surveys were identical, except for the inclusion of additional questions in the follow-up survey to further facilitate measurements of change between the two rounds, and the deletion of some questions related to health insurance uptake.

The instrument was pre-tested multiple times during the training of field interviewers, to ensure that the questions were comprehensible and appropriate, and to determine response categories for the final version of the instrument. Pre-testing was conducted in Kandal province with 60 households. The instrument was designed in the Khmer language, and the final version (after pre-tests) was then translated into English.

## Sampling Methodology

The impact evaluation consisted of two rounds – a baseline and follow-up survey. Because insurance uptake among those who received the low-value coupon was initially very low, it was decided to sample 204 extra low-value coupon households in the baseline survey who were

known to have bought health insurance (of which 65 were in Kampot). The extended sample was only used when analysing health insurance uptake, since the original sample for Kampot was too low to detect any differences in adverse selection of households in the three months prior to becoming a scheme member. The randomised sample (excluding the 65 additional households) was also used for the remainder of the analysis, including the IV analysis, since the randomisation of the sample is necessary for interpretation of estimates.

In total, 672 households from Kampot OD were surveyed at the baseline, and 648 of these were successfully interviewed during the follow-up survey. Table 1 shows the results of these household interviews.

While the report draws on information collected in the baseline for some analysis, data from the follow-up survey was used to measure the impact of the scheme in Kampot OD, including IV analysis.

## Data Analysis

Data was entered into a specially designed database in MS Access at the Domrei Research and Consulting office, cleaned in Microsoft Access, and analysed using Stata 11. Data was analysed using percentages, percent distributions, rates, t-tests, and instrumental variables. Adverse selection was analysed by comparing the results of the t-test between scheme members and non-members. Retention of insurance was calculated using GRET data and background characteristics (wealth and health status) from the baseline survey.

Rates of health shocks were calculated according to person-months at risk. A health shock was defined as seven or more days of loss of usual activity due to illness, a death in the household, or more than KHR 400,000 (approximately USD 100) spent on treatment.

To determine insurance status in the calculation of retention rates, administrative data collected by SKY was used, which tolerates two months of discontinuation between the renewal of membership. For example, if a household was a scheme member in only January 2009 and April 2009, January 2009 was considered as the start date and April 2009 as the second month of membership. If a scheme member dropped out for three or more months, the household was not included again in the analysis, even if it later rejoined the scheme.

Event histories of household health shocks were collected in the follow-up survey, and a longitudinal dataset of health shocks was reconstructed, together with insurance status from the GRET administrative data. Thus, in the event history analysis, scheme members were only considered as members if the health shock occurred within the start and end dates of insurance coverage. All health shocks occurring within 12 months before the date of interview in the follow-up survey were recorded. Rate estimation requires that the numerator and the denominator cover the same population. In estimating the health shock rate, health shocks were defined as events occurring 12 months before the follow-up survey. However, the population at risk in the denominator was counted at the time of the baseline survey. Therefore, the rate estimation excluded all health shocks of persons not residing in the household at the time of the interview, and all health shocks which were deaths.

The randomisation of coupon status in the sample design allowed the measurement of the effect of offering insurance at a discounted price compared to those who paid the full price. To get this estimate, outcomes can simply be compared between the treatment and control groups. However, this simple comparison cannot estimate the effect of insurance on the insured. Instead, instrumental variable (IV) analysis has to be used. IV analysis is used because comparison of outcomes between the insured and uninsured through ordinary least squares (OLS) regression will yield incorrect estimates, since membership is endogenous (i.e., its value is determined by the functional relationship of other variables in the model). For example, if people with health problems are more likely to buy insur-

ance, scheme membership will predict poor health, even if membership actually improves health. IV analysis corrects for this bias.

The IV analysis requires the identification of an instrument which causes variation in the treatment variable. At the same time, the instrument cannot have a direct effect on the study outcome; i.e., it only affects the outcome indirectly through the treatment variable. To measure the effect of insurance on households that purchased insurance due to the discount (the impact of insurance), the effects had to be estimated by applying the following instruments to the equations: coupon status (=1 for those who were offered a high-value coupon); months since village meeting; and, an interaction between the two. The months since village meeting and the interaction between the two variables were included to take into account the fact that scheme membership discontinuation differs based on the time since the village meeting. Scheme membership is defined as a three-month average membership rate, centred on month  $t$ , to account for recall errors about the date of health incidents. Note that in the IV analysis, a health shock is defined as seven or more days of absence from usual activities, or death.

The IV analysis has two stages. As noted above, IV analysis requires the instrument (high-value coupon, time since village meeting, and the interaction between the two) be correlated with scheme membership. The first stage regression measures the appropriateness of the instrument. This can be measured by analysing the F-statistic. The rule of thumb is that the F statistic should be higher than 10.<sup>5</sup>

The second stage of IV analysis measures the impact of insurance on the insured. The impact of insurance is measured by comparing the control group with the IV difference. As shown in Levine et al (2011), in the SKY IE a very small proportion (less than 5%) of low-value coupon holders actually purchased insurance in the months following the village meeting. Therefore, this group was used as the control group, and compared with those who purchased insurance due to the high-value coupon and remained in the scheme (the 'insured'). For simplicity in this paper, the groups are often referred to simply as scheme members and non-members (of which 96% were uninsured).

5 See Murrey (2006).

## Limitations

The Kampot OD sample was unfortunately too small to make any meaningful measurements of adverse selection (i.e., that people in poor health are more likely to purchase insurance compared to those in good health). The following sections will therefore focus on the descriptive analysis and forthcoming findings from Levine et al (2011) which examine selection into insurance throughout the SKY programme.

The use of randomised price as an instrument estimates the effect of insurance on those who purchase insurance due to the high-value coupon. As shown in Levine et al (2011), this group may not be representative of the entire population since those who paid the full price may have more health problems, and thus expect higher future health care expenditures. The benefits of insurance may therefore be higher for this group compared to estimates in this report. Conversely, decliners of insurance, especially those offered the high-value coupon, may expect low benefits because they anticipate low health care utilisation, and this group may have fewer benefits from insurance compared to the findings.

The F-statistic for the incidence sample in Kampot OD is below the recommended value of 10, and therefore the IV analysis will not adequately reflect the impact of insurance on the insured. Because the instrument is weak in the case of incidence, standard errors will be underestimated and test statistics could be incorrect.<sup>6</sup> As a result, relationships must be interpreted with caution. The analysis, therefore, draws on findings from the SKY IE (conducted in four ODs, including Kampot), where the F-statistic far surpasses the recommended value.<sup>7</sup>

Because of the small sample size, the analysis could not measure the effect of insurance coverage on preventive health care, such as antenatal care and place of birth, in the IV analysis. Similarly, there are several indicators related to health service utilisation which could not be measured, including proportion of people visiting a hospital on the first day of illness, and economic impacts such as changes in health-related debt or land ownership compared to the previous year.

6 See Murrey (2006).

7 The F-statistic for incidence level data in the SKY IE was  $F=129$ .

# Results

## 1. Health Insurance Uptake and Retention

### 1.1 Health Insurance Uptake

Those who choose to purchase insurance typically differ markedly from those who decline insurance. Thus, various statistics were analysed (such as respondents' health-seeking behaviours and household background characteristics), to see which factors have an effect on health insurance uptake. Specifically, the likelihood of scheme member households to have health problems in the past was investigated, which could predict higher future health care expenditures compared to households that did not choose to purchase insurance.

About 3.4% of scheme members had a health shock in the two to four months before the village meeting, compared to 2.6% of non-members (Table 22). However, these percentages correspond to eight scheme members and 13 non-members, making any interpretation of this finding irrelevant because of the low number of observations. Correspondingly, the low number of observations makes analysis by where treatment irrelevant. Of the remaining variables tested, only the variable of a household having one member in self-reported poor

health showed a significant difference between the proportion of scheme members (78.0%) and non-members (62.2%).

Table 3 shows the summary statistics of household background characteristics, irrespective of OD. About 6.4% of scheme members and 4.3% of non-members had a household member who had lost seven or more productive days due to illness in the two to four months before the village meeting. <sup>8</sup> The corresponding T-test shows that the difference between scheme members and non-members is statistically significant at 0.01%. This finding shows that households where a member missed seven productive days or more due to illness in the past 12 months were more likely to purchase insurance coverage.

Similarly, Table 3 shows statistically significant differences between scheme members and non-members using a public health facility in the two to four months before the survey. Scheme members also had a higher proportion of at least one household member in poor health compared to non-members, supporting the hypothesis that households become members of a health insurance scheme if they foresee health expenditures in the future. The associations between the above

<sup>8</sup> For children, this means days away from school.

Table 2: Summary statistics of household background characteristics in Kampot OD, baseline survey.

Kampot OD	Scheme members <sup>§</sup>	Non-members <sup>#</sup>	T-score	Total
Observations	231	505		736
Missed 7 or more days of main activity due to injury/illness, 2-4 months before meeting*	3.4%	2.6%	0.662	
At least 1 household member in poor health	<b>78.0%</b>	<b>62.2%</b>	<b>4.300**</b>	
At least 1 household member in excellent health	40.2%	44.8%	1.184	
Household with children under five years old	43.1%	44.6%	0.368	
Household with adult over 65 years old	21.6%	17.2%	1.401	
Very poor household (as ranked in the Composite Wealth Index)	22.0%	21.1%	0.265	

\* 'Meeting' refers to the village meeting where insurance coupons were distributed.

\*\* Statistically significant at  $p < 0.01$ .

<sup>§</sup> High-value coupon recipients.

<sup>#</sup> Low-value coupon recipients.

Table 3: Summary statistics of household background characteristics, total SKY Impact Evaluation sample, baseline survey.

Full sample	Scheme members <sup>§</sup>	Non-members <sup>#</sup>	T-score	Total
Observations	1476	3847		5323
Missed 7 or more days of main activity due to injury/ illness, 2-4 months before meeting <sup>a</sup>	6.4%	4.3%	3.159**	
Missed 7 or more days of main activity due to injury/illness and used a public health facility, 2-4 months before the meeting <sup>a</sup>	3.9%	2.7%	2.154*	
Missed 7 or more days of main activity due to injury/illness and used a private health facility, 2-4 months before the meeting <sup>a</sup>	4.1%	2.4%	3.407**	
At least 1 household member in poor health	79.9%	67.7%	8.881**	
At least 1 household member in excellent health	22.8%	21.5%	1.001	
Household has at least 1 child under five years old	39.0%	38.5%	0.353	
Household has at least 1 adult over 65 years old	24.4%	23.3%	0.825	
Very poor household (as ranked in the Composite Wealth Index)	17.3%	13.9%	3.024**	

<sup>a</sup> 'Meeting' refers to the village meeting where the insurance coupons were distributed.

\* Statistically significant at  $p < 0.01$ .

\*\* Statistically significant at  $p < 0.05$ .

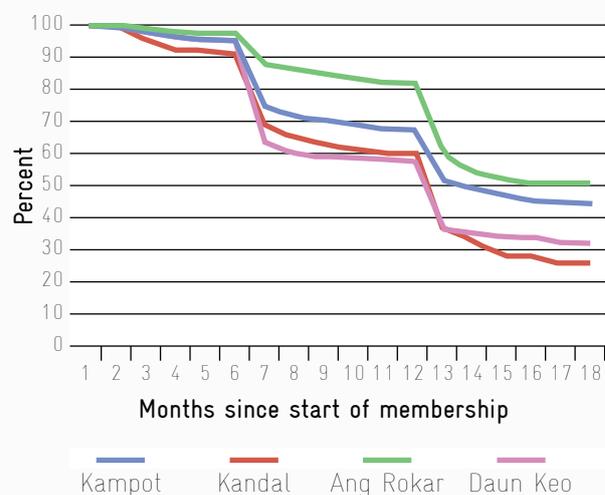
<sup>§</sup> High-value coupon recipients.

<sup>#</sup> Low-value coupon recipients.

findings were confirmed by the analysis of the total SKY IE sample, which concluded that there is a positive relationship between having a health shock shortly before the village meeting and becoming a scheme member, and between poor health and the likelihood of becoming a scheme member.<sup>9</sup>

Table 3 also shows that there is a positive and statistically significant difference between scheme members and non-members in regards to poverty. Households that were ranked as very poor in the Composite Wealth Index were 3.4% more likely to become a scheme member compared to households that were ranked as poor and better-off.<sup>10</sup>

Figure 1: Percentage of scheme members in the household sample since membership started in each OD, by months (Source: SKY administrative data).



<sup>9</sup> See Levine et al (2011).

<sup>10</sup> For a detailed explanation of how the Composite Wealth Index was computed, please see Appendix 2.

Figure 2: Membership in sample households in Kam-pot OD since start of membership, by wealth status (Source: SKY administrative data and SKY IE baseline survey).



Figure 3: Membership in sample households in Kam-pot OD since start of membership, by health status (Source: SKY administrative data and SKY baseline survey).



## 1.2 Retention of SKY Members

Retention of insurance members in the survey <sup>11</sup> was also analysed by looking at insurance membership status over time. <sup>12</sup> Figure 1 shows the percentage of scheme members since the membership started, for each OD in the SKY IE study. Membership rates in each OD declined slowly over time, with sharper dips after six and 12 months, coinciding with the contract renewal dates. As Figure 1 also shows, this membership trend was similar in all areas surveyed. In each OD, over 50% of initial members had dropped out after 18 months of membership. A higher proportion of households in Kandal dropped out after 18 months (74%) compared to the other ODs. In Kam-pot OD 56% of ever scheme members had dropped out of the scheme after 18 months.

When looking at the same data by wealth group in Kam-pot OD, all wealth groups lost a significant number of members after six and 12 months, with the very poor and poor households having the highest dropout rates after six months, and the better-off households having the highest dropout rate after 12 months (Figure 22). Interestingly,

very poor households were less likely to drop out than poor and better-off households (47% compared to 59% and 57%, respectively). After 18 months, all groups lost at least half their members, with the biggest loss from the better-off group.

Lastly, when retention of members by self-reported health status in Kam-pot OD was analysed, the same downward trend was observed (Figure 33). More households in self-reported poor health joined the scheme at some point in time than those in self-reported good health (36.4% and 21.5%, respectively).<sup>13</sup> After 18 months, over 50% of ever members in both self-reported good and poor health had dropped out.

11 Members in the survey are predominantly made up of high-value coupon holders, who may not be representative of the average member.

12 As noted elsewhere in the report, membership in the retention analysis is static. However, retention does not include households who drop out for more than three months and then later rejoin.

13 Households with one or more members in self-reported poor health versus households with no members in self-reported poor health.

## 2. Health Shocks

In total, 65% of the Kampot OD households in the sample experienced a health shock in the 24 months preceding the follow-up survey.

In Kampot OD, 44.8% of households experienced a health shock in the 12 months preceding data collection for the follow-up survey. Table 44 shows the percent distribution of health shocks experienced by all households in the 12 months preceding the follow-up survey, by membership status and OD.

Of the 44.8% of households who experienced a health shock in Kampot OD, about 71% experienced one health shock, 23.1% experienced two health shocks and 5.9% of households experienced three or more health shocks in the 12 months preceding the follow-up survey. Table 5 and Figure 5, below, show the percentage of households in each OD that experienced a health shock in the 12 months preceding the follow-up survey, according to the number of health shocks among households. Multiple health shocks were slightly more common in Kampot OD than in Kandal, Ang Rokar and Daun Keo ODs.

The incidence of health shocks in Kampot OD was 101.8 per 1,000 person-years at risk, lower than in Koh Thom and Ang Rokar ODs, but slightly higher than in Daun Keo OD (Table 6).

Figure 4: Households in Kampot OD that experienced a health shock in the 24 months preceding the follow-up survey (N=658).

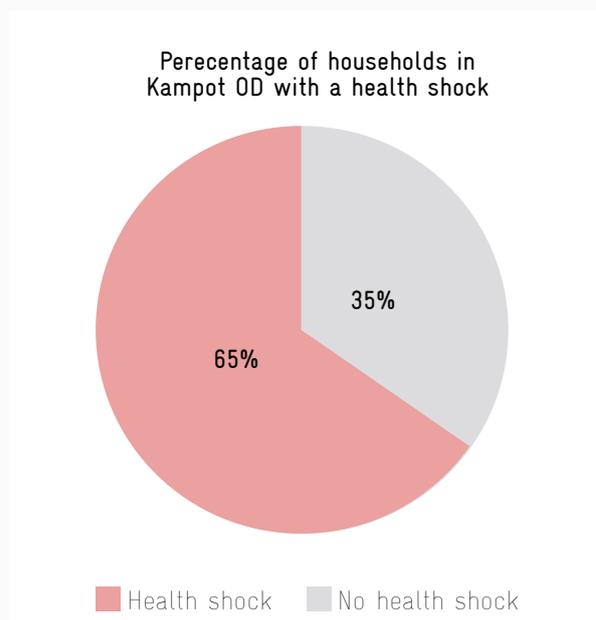


Table 4: Households with health shocks 12 months before follow-up survey, by OD.

Operational district	No health shock	Health shock	Total	Observations (N)
Kampot OD, Kampot	55.3%	44.8%	100%	648
Koh Thom OD, Kandal	52.6%	47.4%	100%	1063
Ang Rokar OD, Takeo	55.2%	44.8%	100%	1323
Daun Keo OD, Takeo	56.2%	43.8%	100%	1961
Total	55.0%	45.0%	100%	4995
Clustered t-test	Chi2=2.3353	Pr=0.51		

Figure 5: Number of health shocks experienced by households, by OD (Source: SKY IE follow-up survey).

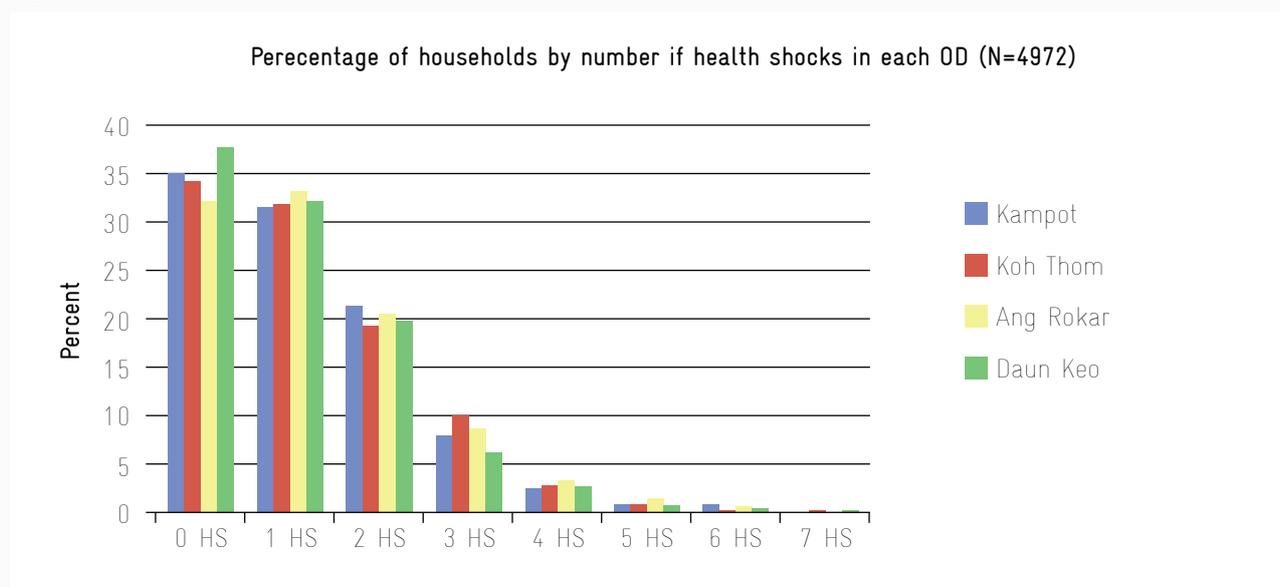


Table 5: Number of health shocks experienced by households with health shocks, by OD (Source: SKY IE follow-up survey).

Operational district	1 health shock	2 health shocks	3+ health shocks	Total	Observations (N)
Kampot OD, Kampot	71.0%	23.1%	5.9%	100%	290
Koh Thom OD, Kandal	73.8%	22.4%	3.8%	100%	504
Ang Rokar OD, Takeo	74.7%	21.3%	4.1%	100%	593
Daun Keo OD, Takeo	78.7%	18.4%	2.9%	100%	859
Total	75.6%	20.7%	3.8%	100%	2246
Clustered t-test:	Chi2=9.0759	Pr=0.17			

Table 6: Incidence of health shocks 12 months before the SKY IE follow-up survey, per 1,000 person-years at risk.\*

Operational district	Rate	Health shocks	Person-years at risk
Kampot OD, Kampot	101.8	366	3594
Koh Thom OD, Kandal	108.7	582	5355
Ang Rokar OD, Takeo	107.2	669	6240
Daun Keo OD, Takeo	98.9	926	9363
Total	103.6	2543	24552

\*Incidence rate includes health shocks that were the death of a household member.

Table 7: Incidence of health shocks in Kampot OD 12 months before the SKY IE follow-up survey, per 1,000 person-years at risk, by membership status.

Kampot OD	Rate	Health shocks	Person-years at risk
Scheme member	98.9	69	697
Non-member	102.5	297	2897

### 3. First Stage Regression for Instrumental Variable Analysis

First stage regression models are included in Appendix 2. The first stage regression shows an F statistic of four ( $p < 0.01$ ) for the incident level data using average membership in the last three months (Table 17), and an F-statistic lower than 10 for current members at the individual level (Table 18). This indicates that the instruments are not strongly correlated with membership, which is probably due to the small sample size, since correlation was high (F-statistic=130) for the sample including all four ODs for the incident. See the limitation section for more information. The remaining instruments tested, including for the household sample, all had F-statistics higher than 10 (Table 18 and Table 19).

In the SKY IE report, many significant differences between the treatment and control group were found. When the same methodology was applied to the Kampot OD sample in this report, statistically significant differences were not found between the treatment and control groups. This is most likely due to the limited sample size in Kampot OD. Therefore, the analysis below does not yield many conclusive statements about health and socio-economic impacts of insurance (see the limitations in the methodology section for more details). The reader should therefore refer to the findings in the SKY IE report.<sup>14</sup>

<sup>14</sup> See Levine et al (2011).

## 4. Health-seeking Behaviour

### 4.1 Health Care Utilisation and Provider Choice Following a Health Shock

Micro health insurance significantly lowers the out-of-pocket costs of medical treatment in contracted public health facilities. Therefore, the scheme was expected to increase health care utilisation at public health facilities. To test this hypothesis, the sources of care following a health shock were examined.

Although they are not significant at the 5% level ( $p>0.05$ ), the IV estimates are in line with the findings from the main study. Micro health insurance impacts the health utilisation behaviour of the insured in Kampot OD by increasing public health care utilisation, and reducing utilisation of unregulated care.

Many households also sought multiple treatments for health shocks. Rates of public health centre use following a health shock were therefore examined, and results found that the insured in Kampot OD were 56% more likely to have ever sought treatment for a health shock at a public health centre or public hospital than the control group, although this was not significant at the 95% confidence level ( $p>0.05$ ). In particular, scheme membership increased ever-use of public health centres following a health shock by 40%, marginally significant at the 91% confidence level (Table 8;  $p=0.09$ ), and decreased ever use of a private doctor by 34% ( $p>0.05$ ). These findings show the same trends as findings from the whole sample, where rates of health centre use following a health shock were 22% higher for scheme members (significant at the 1% level,  $p<0.01$ ).<sup>15</sup> Furthermore, when looking at provider choice following a health shock, insurance reduced reliance on private providers and drug sellers as the first source of care by 37% ( $p>0.05$ ) and 17% ( $p>0.05$ ), respectively, and increased reliance on public providers by 37% ( $p>0.05$ ; see Table 8).

15 Ibid.

### 4.2 Health-Seeking Behaviour Following a Health Shock

By reducing the cost of care at public health providers, it was expected that micro health insurance would change health-seeking behaviours following a health shock in a number of ways.

It was not expected that micro health insurance would reduce foregone health care, since unregulated health care in Cambodia was very cheap and easily accessible at that time. The IV estimate for Kampot OD, as well as for the SKY IE sample, found no significant difference between scheme members and non-member households who did not seek care due to a lack of funds ( $p=0.5$ ; Table 9).<sup>16</sup>

Micro health insurance was also expected to lead to a reduction in delayed care. This was tested by examining days until first treatment and days until a visit to a hospital following a health shock. While the differences were not significant, counter to expectations, insured individuals had longer delays in both initially seeking treatment and in visiting a hospital following a health shock than the control group. The same trend was observed in IV analysis of all ODs in the SKY IE.

### 4.3 Other Health-Seeking Behaviour

While the main focus of the SKY impact evaluation was on care following a major health shock, the effect of the micro insurance scheme on preventive care was also examined. No significant impact was found on the proportion of children whose immunisations were up to date (Table 10). The results on preventive care in Kampot OD have a low statistical power because of the small sample size of both women of reproductive age (for birth outcomes and contraception) and children (for immunisation measures).

16 Ibid.

Table 8: Impact on provider type choice and treatments after a health shock (Source: SKY IE baseline and follow-up surveys).

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	IV N
Was the incident ever treated at a public hospital?	0.23 (0.04)	0.17 (0.03)	0.062 (0.05)	1.241	0.21	378	0.225 (0.33)	0.681	0.50	334
Was the incident ever treated at a health centre?	0.17 (0.03)	0.10 (0.03)	0.065 (0.037)	1.76	0.08	378	0.401 (0.238)	1.684	0.09	334
Was the incident ever treated at a public hospital or health centre?	0.38 (0.04)	0.26 (0.04)	0.120* (0.058)	2.077	0.04	378	0.562 (0.364)	1.541	0.12	334
Was the incident ever treated at a drug seller?	0.31 (0.05)	0.35 (0.05)	-0.038 (0.048)	-0.78	0.44	378	-0.212 (0.331)	-0.641	0.52	334
Was the incident ever treated at a private doctor?	0.63 (0.04)	0.69 (0.03)	-0.059 (0.052)	-1.143	0.25	378	-0.343 (0.321)	-1.067	0.29	334
Was the incident first treated at a public hospital or health centre?	0.23 (0.04)	0.16 (0.03)	0.062 (0.045)	1.363	0.17	378	0.368 (0.293)	1.256	0.21	334
Was the incident first treated at a drug seller?	0.26 (0.04)	0.29 (0.04)	-0.034 (0.044)	-0.771	0.44	378	-0.167 (0.306)	-0.546	0.59	334
Was the incident first treated at a private doctor?	0.40 (0.04)	0.45 (0.05)	-0.047 (0.055)	-0.844	0.40	378	-0.365 (0.355)	-1.027	0.30	334
Was the incident first treated at a non-public place?	0.72 (0.04)	0.77 (0.03)	-0.054 (0.048)	-1.117	0.26	378	-0.371 (0.296)	-1.252	0.21	334

Endogenous variable: Average membership one month before, during, and one month after health shock.

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error.

Table 9: Impact on health care utilisation following a health shock (Source: SKY IE baseline and follow-up surveys).

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	IV N
Foregone care (did not seek treatment due to lack of funds)	0.02 (0.01)	0.03 (0.01)	-0.013 (0.015)	-0.855	0.39	378	0.054 (0.074)	0.733	0.46	334
Stopped treatment due to lack of money	0.03 (0.02)	0.04 (0.02)	-0.006 (0.026)	-0.228	0.82	378	0.008 (0.134)	0.063	0.95	334
Days until first treatment (top-coded at 30 days; never treated is 30 days)	4.09 (0.50)	3.35 (0.51)	0.736 (0.666)	1.106	0.27	378	6.073 (3.805)	1.596	0.11	334
Days until hospital (top-coded at 30 days; never went to hospital is 30 days)	7.07 (0.71)	6.12 (0.58)	0.943 (0.819)	1.152	0.25	378	3.929 (5.869)	0.669	0.50	334

Endogenous variable: Average membership one month before, during, and one month after health shock.

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error.

Table 10: Other impact on health-seeking behaviour (Source: SKY IE baseline and follow-up surveys).

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	IV N
All vaccinations up-to-date at time of survey*	0.33 (0.05)	0.28 (0.04)	0.05 (0.046)	1.082	0.28	405	0.243 (0.211)	1.152	0.25	402

\*Among children 6 years old and younger.

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error.

## 5. Economic Effects of Micro Health Insurance

### 5.1 Economic Effects Following a Health Shock

Analysis of out-of-pocket expenses following a health shock was also conducted. The IV estimate showed that households induced to purchase insurance coverage due to the high-coupon value paid USD 24.60 less for health care following a health shock than non-members, who on average paid USD 95.80 ( $p > 0.05$ ; Table 11). This reduction in health care costs can be due to several factors. First, micro health insurance coverage can reduce the number of very high medical expenses. Out-of-pocket costs were thus calculated for each health shock incident. It was found that coverage reduced health care costs over USD 250 by 5% ( $p > 0.05$ ). Membership also posits that insurance will reduce out-of-pocket expenditures following a health shock by reducing the percentage of households paying for expensive private care. Indeed, in Kampot OD, the insured were 32.9% less likely to spend more than USD 5 at a private health care provider following a health shock, compared to the baseline of 64% (Table 11). While none of the above findings were found to be significant at the 5% level, they do correlate with

trends from the SKY IE study, which showed statistically significant differences between treatment and control groups for the total amount spent on care, and the share of health shocks with total costs greater than USD 250 and lower than USD 5.<sup>17</sup>

Analysis was also conducted on how households pay for the costs of care following a health shock in Kampot OD. Non-members were also more likely to use cash or savings to pay for treatment, and less likely to sell assets to pay for treatment (although these findings are not significant at the 5% level; Table 12).

Findings for the SKY IE sample found that members were more likely to use their insurance to cover the costs of treatment, less likely to use an asset to pay for treatment, and less likely to take an interest-bearing loan to pay for treatment. None of the remaining variables in Table 14 were statistically significant for the SKY IE sample.<sup>18</sup>

17 See Levine et al (2011).

18 Ibid.

Table 11: Economic impacts following a health shock (Source: SKY IE baseline and follow-up surveys).

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	IV N
Total spent on care (USD)	89.36 (13.06)	95.80 (13.31)	-6.439 (16.585)	-0.388	0.70	378	-24.583 (86.962)	-0.283	0.78	334
Missed work days	38.27 (5.38)	47.60 (7.92)	-9.326 (7.989)	-1.167	0.24	401	-10.14 (31.75)	-0.319	0.75	337
Proportion with total private care costs $\geq$ USD 5	0.58 (0.04)	0.64 (0.03)	-0.06 (0.055)	-1.094	0.27	378	-0.349 (0.328)	-1.065	0.29	334
Proportion with total costs $\geq$ USD 250 (includes both serious and costly, unless otherwise specified)	0.09 (0.02)	0.10 (0.02)	-0.01 (0.028)	-0.352	0.73	378	-0.054 (0.143)	-0.376	0.71	334

Endogenous variable: Average membership one month before, during, and one month after health shock.

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error.

Table 12: Method of payment following a health shock (Source: SKY IE baseline and follow-up surveys).

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	IV N
Is the scheme used to pay for any of the treatments?	0.16 (0.03)	0.07 (0.03)	0.089 (0.048)	1.842	0.07	378	0.458 (0.235)	1.95	0.05	334
Is cash used to pay for any of the treatments?	0.49 (0.05)	0.48 (0.04)	0.014 (0.06)	0.232	0.82	378	-0.102 (0.341)	-0.299	0.77	334
Are savings used to pay for any of the treatments?	0.18 (0.04)	0.21 (0.03)	-0.039 (0.041)	-0.938	0.35	378	-0.233 (0.264)	-0.882	0.38	334
Does family pay for any of the treatments?	0.13 (0.03)	0.17 (0.03)	-0.039 (0.041)	-0.96	0.34	378	-0.235 (0.263)	-0.895	0.37	334
Is work used to pay for any of the treatments?	0.20 (0.05)	0.21 (0.03)	-0.006 (0.048)	-0.115	0.91	378	0.019 (0.287)	0.066	0.95	334
Are assets used to pay for any of the treatments?	0.18 (0.05)	0.17 (0.03)	0.001 (0.057)	0.018	0.99	378	-0.068 (0.388)	-0.175	0.86	334
Are loans without interest used to pay for any of the treatments?	0.07 (0.02)	0.08 (0.03)	-0.007 (0.03)	-0.224	0.82	378	0.118 (0.169)	0.699	0.48	334

Endogenous variable: Average membership one month before, during, and one month after health shock.

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error.

Table 13: Other economic impacts (Source: SKY IE baseline and follow-up surveys).

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	N
Amount of cash savings (USD)	26.90 (4.32)	23.01 (3.22)	3.89 (4.297)	0.905	0.37	669	14.201 (20.762)	0.684	0.49	669
Proportion of children aged 6-17 enrolled in school	0.71 (0.03)	0.69 (0.03)	0.018 (0.032)	0.566	0.57	488	0.1 (0.149)	0.669	0.50	488

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error.

Table 14: Impact on debt characteristics (Source: SKY IE baseline and follow-up surveys).

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	N
Amount borrowed in total (USD)	150.29	188.57	-38.274	-0.952	0.34	275	-16.411	-0.086	0.93	275
	(27.04)	(33.72)	(40.202)				(190.611)			
Proportion of households with health-related loans	0.29	0.34	-0.053	-0.985	0.32	274	-0.129	-0.562	0.57	274
	(0.04)	(0.04)	(0.054)				(0.23)			
Value of health-related loans (USD)	36.31	42.50	-6.192	-0.693	0.49	275	-1.335	-0.033	0.97	275
	(7.61)	(6.45)	(8.931)				(40.865)			

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error.

In addition to examining the costs of each health shock, the economic outcomes of SKY on households were also examined. SKY members in Kampot OD were found to have USD 14 more in cash savings than non-members ( $p>0.05$ ; Table 13). SKY members also had a slightly higher proportion of children enrolled in school (Table 13). However, none of these differences were significant at the 5% level.

If micro health insurance is effective, families are expected to be less likely to take on new loans due to health care costs. The IV estimate is that scheme members have 13% less health-related debt than the control group. However, this was not significant at the 5% level (Table 14).

## 6. Health Outcomes

Although the SKY IE was not expected to show significant impacts on overall health outcomes in the short time period between the baseline and follow-up surveys, the questionnaire included a section on objective measures of children's health such as body mass index (BMI), height-for-age and weight-for-height ratios. Membership had no detectable effect on any of these measures (Table 15).

## 7. Impact on Trust and Satisfaction

An index was also computed on voluntary members' trust and satisfaction with public and private doctors. The scale ranged from 1-5, with 1 being the lowest amount of trust and satisfaction, and 5 being the highest. Scheme members had slightly higher trust and satisfaction scores for both public and private doctors than non-members. However, this was not significant at the 5% level (Table 16).

Table 15: Impact on intermediary health outcomes of micro insurance coverage (Source: SKY IE baseline and follow-up surveys)..

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	IV N
Height-for-age Z-score	-1.54 (0.12)	-1.64 (0.25)	0.099 (0.261)	0.378	0.71	305	-0.295 (0.612)	-0.482	0.63	302
BMI-for-age Z-score	-0.40 (0.10)	1.98 (2.46)	-2.382 (2.458)	-0.969	0.33	304	-0.627 (1.374)	-0.457	0.65	301
Weight-for-age Z-score	-1.25 (0.11)	-1.26 (0.07)	0.011 (0.129)	0.085	0.93	304	-0.003 (0.467)	-0.007	0.99	301
Proportion of individuals absent from usual activity due to illness/injury	0.09	0.10	-0.012	-1.158	0.25	3617	-0.064	-1.03	0.30	3602

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error for that indicator.

Table 16: Impact on provider trust (Source: SKY IE baseline and follow-up surveys)..

	Members	Non-members	Difference	T-Statistic	P> t	N	IV Difference	IV T-Statistic	IV P> t	IV N
Average trust and satisfaction score for public doctors	3.87 (0.09)	3.73 (0.10)	0.136 (0.119)	1.149	0.25	174	0.516 (0.369)	1.397	0.16	174
Average trust and satisfaction score for private doctors	3.85 (0.06)	3.72 (0.07)	0.132 (0.086)	1.539	0.12	174	0.416 (0.382)	1.088	0.28	174

Instrument: Coupon status, months between health shock and meeting, and an interaction between the two.

Note: Numbers in brackets and italics are the standard error.

# Conclusions

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Unfortunately, the reported analysis was not able to make statistically conclusive statements about the health and socioeconomic impacts of micro health insurance in Kampot OD from. This is most likely due to the limited sample size in Kampot OD. Therefore, when drawing conclusions the reader may refer to the report by Levine et al (2011) utilising the SKY IE sample. This report found many significant differences between the treatment and control groups using IV analysis. The following statistically significant differences were found when looking at the whole sample:

- Scheme members were more likely to have their health shock treated at a public health facility, and less likely to be first treated at a drug seller, private doctor and/or a private health care facility.
- Scheme members overall spent less on health care than non-members. Specifically, they were less likely to have expenditures greater than USD 250, and they had lower costs when they did seek private care. Members were also less likely to pay for the costs associated with health shocks through the sale of assets and taking out loans with interest.
- Micro health insurance coverage also had a positive impact on debt; on average, scheme members had USD 70 less debt, and a lower total value of all health-related loans.
- Micro insurance membership significantly increased trust in the scheme. However, it did not have a statistically significant impact on trust in public doctors.

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## Annex 1: Composite Wealth Index

This index was developed by Domrei Research Consulting and tested in over 15 surveys (corresponding to a combined sample over 25,000 Cambodian households). It correlates well with social and health indicators (e.g. literacy, educational attainment, nutritional status, etc.). It is designed to provide a quick and simple, yet robust and reliable, system to rank and classify households in comparable samples (e.g. in a rural population), and to contrast the situations of the very poor and the better-off households.

To do this, respondents are categorised into three groups to assess possible inequities in health. The cut-off points are the quartile values of a wealth score in the Kampot sample. Households are then ranked by wealth, from lowest to the highest, using the following data: housing type, assets, animals, and type of toilet. The interviewers also observe and rank each household into three categories: very poor, poor and better-off.

The algorithm below was used to attribute points for each answer, and the wealth score was computed for each household by adding these points together. Scores ranged from 0 to a maximum of 14 points. The algorithm used to attribute a wealth score to a household is the following: an asset indicator is generated where no assets is 0, ownership of at least one radio is worth 1, ownership of a TV, a bicycle, or a refrigerator is worth 2, ownership of a boat or oxcart is worth 3 and ownership of a car is worth 4. A livestock indicator is generated where 'animal=0' if the household does not own any animals. In any other case,

**animal=round((poultry/2+pig+goat)/2+(cow+buffalo)/2)**

The wealth score was computed by adding the assets and animals indicators with house type, toilets, and interviewers' subjective wealth assessment:

**wscore = housetype + assets + animals + toilets + wealth.**

Two cut-off points were then selected, such that the very poor category corresponded as closely as possible to the lowest 15% and the better-off category corresponded to the highest 15%. The very poor category was thus defined as having a wealth score of 0-5 points, and the better-off category as having a score of 10-14 points, which corresponds to 15.0% and 16.5% of the households, respectively. The attributed wealth scores and wealth groupings for the Kampot OD households used the whole 2009 SKY IE dataset, to allow for comparisons between provinces and to ensure that households have the same rank and score across all studies.

The few households with missing values for a variable used to compute the Composite Wealth index were excluded from analyses involving wealth, but were included when computing the baseline indicators. This explains why the number of observations ('n') is slightly smaller when an indicator is disaggregated by wealth.

Figure 6: Distribution of households according to wealth score, 2008 and 2009.



## Annex 2: First Stage Regressions

Table 17: First stage regression for incidence-level outcomes in the 12 months before the SKY IE follow-up survey.

	Average scheme membership following incident
Constant	0.2816
High coupon	0.3003
Months since meeting	0.0076
High coupon*months since meeting	-0.0036
Observations	337
Adjusted r square	0.045
F-test	4

Table 18: First stage regression for individual-level outcomes in the 12 months before the SKY IE follow-up survey.

	Current membership status	Ever in scheme	Percent of year in scheme
Constant	0.1261	-0.0261	0.0693
High coupon	0.3007	1.1573	0.9142
Months since meeting	-0.0002	0.0097	0.0024
High coupon*months since meeting	-0.1013	-0.0446	-0.4030
Observations	3602	3602	3602
Adjusted r square	0.023	0.145	0.075
F-test	4	45	17

Table 19: First stage regression for household outcomes in the 12 months before the SKY IE follow-up survey.

	Current membership status	Ever in scheme	Percent of year in scheme	Membership status over last 4 months
Constant	0.1322	-0.0150	0.0782	0.1141
High coupon	0.2539	0.9398	0.7428	0.5104
Months since meeting	-0.0016	0.0081	0.0010	-0.0007
High coupon*months since meeting	-0.0060	-0.3167	-0.0294	-0.0199
Observations	669	669	669	669
Adjusted r square	0.037	0.16	0.093	0.044
F-test	10	56	32	14





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