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# Encouraging Health Insurance for the Informal Sector

## A Cluster Randomized Trial

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## Abstract

Subsidized voluntary enrollment in government-run health insurance schemes is often proposed as a way of increasing coverage among informal sector workers and their families. This paper reports the results of a cluster randomized control trial in which 3,000 households in 20 communes in Vietnam were randomly assigned at baseline to a control group or one of three treatments: an information leaflet about Vietnam's government-run scheme and the benefits of health insurance; a voucher entitling eligible household members to 25 percent off their annual premium; and both. The four groups were balanced at baseline. In the control group, 6.3 percent (82/1296) of individuals were enrolled in the endline, compared with 6.3 percent (79/1257), 7.2 percent (96/1327), and 7.0 percent (87/1245) in the information, subsidy, and combined intervention groups; the adjusted odds ratios were 0.94, 1.12, and 1.15, respectively. Only among those reporting poor health were any significant intervention effects found, and only for the combined intervention: an enrollment rate of 16.3 percent (33/202) compared with 8.3 percent (18/218) in the control group, and an adjusted odds ratio of 2.50. The results suggest limited opportunities to raise voluntary health insurance enrollment through information campaigns and subsidies, and that these interventions exacerbate adverse selection.


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Produced by the Research Support Team

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by

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## Introduction

The developing world – and some of the developed world too – is in the midst of a push toward universal health coverage (UHC) (World Health Organization 2010; Savedoff et al. 2012). Many low- and middle-income countries are making substantial progress. However, a major challenge is how to expand coverage to informal-sector workers and their families; this group is usually not covered or only partially covered by schemes aimed at formal-sector workers, civil servants, and the poor. Given its size, fully subsidizing this group is difficult from a fiscal perspective. One approach – adopted by Thailand (Pannarunothai et al. 2004) – is to give them full subsidies but somewhat less generous coverage. Another is to encourage voluntary subsidized enrollment, either into a new scheme as has happened in China (Wagstaff et al. 2009a; Wagstaff et al. 2009b; Yip et al. 2012) and Mexico (Frenk et al. 2003; Frenk et al. 2006), or into an existing national social health insurance (SHI) program, as has happened in the Philippines (Obermann et al. 2006; Jowett and Hsiao 2007) and Vietnam (Ekman et al. 2008; Lieberman and Wagstaff 2009; Wagstaff 2010). These approaches have met with mixed success: China and Mexico have achieved high coverage levels, but have almost fully subsidized their schemes, and in China's case enrollment drives by local Communist Party officials have helped.

The Philippines and Vietnam are better tests of the voluntary enrollment model, and here there has been much less progress. The question arises as to what additional measures governments like those in the Philippines and Vietnam might employ to encourage voluntary enrollment. Obvious ones include higher enrollment subsidies, and information and awareness campaigns. There is, however, little evidence on whether such measures are effective. We report in this paper the results of a randomized control trial (RCT) aimed at helping to fill this gap in our knowledge.

**Literature review**

A number of observational studies have identified a variety of factors influencing the demand for health insurance in developing countries. In Kenya, knowledge about enrollment options and procedures was found to be an important determinant for informal-sector workers (Mathauer et al. 2008). In Vietnam, voluntary enrollment was found to increase with expected health benefits of health insurance, measured by proximity to a public hospital and the number of beneficiaries within a family (Nguyen and Knowles 2010). Distance to and the quality of local health facilities were found to be significant influences on enrollment in Rwanda and Guinea, where the affordability of the insurance premium was also found to be a factor (Schneider and Diop 2001; Criel and Waelkens 2003).

By contrast, there are very few rigorous evaluations of efforts to encourage voluntary SHI participation. A recent systematic review of the determinants and impacts of health insurance in developing countries includes just two studies of such efforts (Acharya 2013). In Mexico, randomly-selected communities were subjected to a campaign to increase enrollment in the country's Seguro Popular program and received increased medical personnel and drug supplies; enrollment ended up being 37 percentage points higher in the intervention areas (King et al. 2009). In the other study in Nicaragua, informal-sector workers in open-air markets in Managua were randomly assigned between a group receiving a voucher entitling them to six months free coverage in the SHI program, a group receiving an information pack, and a control group; those receiving the subsidy voucher were found to be 30 percent more likely to enroll than the control group, but those receiving the information pack were actually 5 percentage points less likely to enroll than the control group (Thornton et al. 2010).

Two studies were omitted from the aforementioned systematic review. One (Das and Leino 2011) was an RCT investigating the effects of information on enrollment in India's Rashtriya Swasthya Bima Yojana (RSBY) insurance scheme for the poor; the authors found the information package by itself had negligible effects, but that those who were both given the information package and included in a sample survey were slightly more likely to enroll. The other missing study is of a quasi-experimental study in Bangladesh (Khan and Ahmed 2013) where some localities offered an education intervention about health insurance; the treatment group reported a 34 percent higher willingness-to-pay for health insurance; effects on enrollment itself were not studied.

**Study setting**

The setting is Vietnam, a country which has made a strong commitment to UHC (Lieberman and Wagstaff 2009; Somanathan et al. 2013). Nearly 79 percent of the population in 2010 falls into one of four groups with compulsory or subsidized SHI coverage (Ministry of Health 2011) and our target group is people who are not in any of these groups: farmers and informal-sector workers (as far as SHI in Vietnam is concerned this group includes the self-employed, and wage employees without a contract or with a contract that runs less than three months). These people have the option to enroll in the SHI scheme, but few do; coverage in 2012 was around 26 percent in this group and much lower among the farmers (Vietnam Social Security 2012).

The insurance premium in our target group is around US$ 21 per person per year, with discounts for additional household members. The enrollment process is 'facilitated' by commune-based insurance agents from Vietnam Social Security (VSS) – the organization that runs the SHI scheme; agents receive 4 percent of the premium for each person they

enroll. People can enroll at any time, and the policy is valid for one year. The insurance card is issued within seven days but there are waiting periods – 30 days for regular services, and 36 months for high-tech services (chemotherapy, kidney dialysis, etc.). Enrollees register for a primary care provider, usually a commune health station or district hospital.

**Research design and intervention**

*Study sites and participants*

The RCT was conducted in 20 communes in two rural districts: Kim Bang and Thanh Liem, both in Ha Nam province. Ha Nam is a fairly typical province in the Red River Delta region of Vietnam, and the two districts are also fairly typical rural districts in this region. The province and districts were selected in part due to the willingness of the local authority and insurance agency to collaborate with the study team.

We divided the 39 communes in the two districts into two groups: (a) the RCT communes; and (b) the non-RCT communes. To ensure that the communes in the RCT study site were representative of the two districts as a whole, we used coarsened exact matching (CEM) (King and et al. 2007; King et al. 2010) to arrive at strata of communes that were similar on observables, then within each stratum we randomly assigned communes to (a) or (b). CEM involves deciding on a list of matching variables, converting any continuous variables into categorical variables, and then matching observations according to the categories they fall into on the matching variables. A researcher can either let CEM determine the cutpoints and categories, or can specify the cutpoints (and hence categories). The length and composition of the list of matching variables and the cutpoints affects the number of strata that emerge from the exercise. After some iteration, we settled

on a list of matching variables and vector of cutpoints that produced 12 strata within which we randomly assigned communes to be an RCT study area commune or not. The variables and cutpoints that we settled on were: district (categorical: Kim Bang vs. Thanh Liem); distance to district hospital in km (0, 7.1, 30); distance to provincial hospital in km (0, 12.1, 30); income per capita in VND (0, 143100, 20000); and whether there is a physician employed in the commune's health center (yes vs. no).

Enumerators interviewed every twelfth household in each commune, their initial direction being determined by a toss of a stick in the air at the entrance to the office of the People's Committee. Sampled households who turned out to have no household member in the target group were interviewed but excluded from the analysis.[1]

*Timing of data collection and interventions*

Our baseline survey was conducted in April-May 2012, and the endline survey in June-July 2013. The interventions were administered during the baseline survey: at the end of the interview the household was assigned to one of four groups.

*Interventions*

Group I was the control group: households in this group received nothing. Households in Group II received an information leaflet explaining how to enroll, and listing the benefits of insurance. Group III received a voucher covering 25 percent of the annual premium for every eligible household member: the voucher is valid for a period of six months (June through December 2012), but insurance coverage obtained using the voucher lasts one year from the date of enrollment. Group IV received both the information leaflet

[1] The intention was, in fact, that these households would *not* be interviewed and would be replaced by another household. However, due to a misunderstanding with the survey team, this did not happen.

and the 25 percent premium subsidy voucher. Both the leaflet and the voucher were designed in collaboration and with approval from VSS officials.

*Idea behind the interventions*

Better information should raise enrollment if low coverage is due to lack of information about the scheme. The subsidy should also raise enrollment by reducing the cost of enrollment and encouraging some people to enroll whose willingness-to-pay (WTP) for coverage was initially below the cost of the premium. Low WTP could reflect a household income that is low relative to the premium – an affordability issue. It could be due to limited risk-aversion. Low WTP could also reflect a low (perceived) probability of getting sick, lowering enrollment rates generally and predisposing the scheme to adverse selection. Or households may perceive the financial protection afforded by insurance to be too small, or the quality of services delivered to people with insurance coverage too low. Whatever the cause of low WTP, subsidizing the cost of enrollment should raise the demand for insurance.

*Outcome*

Our outcome of interest is enrollment in the government's SHI scheme. Enrollment is at the individual level – some families may choose to enroll only some family members.

*Sample size and statistical power*

We fixed the household sampling rate to achieve at least 80 percent power at the 5 percent level to detect enrollment rate increases (compared to the control group rate of 2 percent) of 3 percentage points in the cases of groups II and III and 6 percentage points in the case of group IV. These target differences were chosen in part because they were felt to

be the minimum impacts that might be considered meaningful from a policy perspective (information and subsidies are a policymaker's two most obvious policy levers and such low effects would raise serious questions about their usefulness as a mechanism to help achieve UHC), and in part because when we asked government officials in a survey what effects they expected to see, these figures were toward the lower end of their responses.[2] In our calculations, we assumed a standard deviation in the enrollment rate of 0.25, an intra-cluster correlation coefficient (ICC) of 0.2 (the household is our cluster), an average of three (relevant) household members per household, and a loss-to-follow-up of 20 percent. We interviewed a total of 3,000 households.[3]

*Randomization*

Households were randomly assigned to the control group or one of the three treatment groups. To end up with roughly equal sized groups, the study team did the randomization ahead of time using a free online randomization tool.[4] A separate sequence of assignments was generated for each commune. The list size was the number of households to be interviewed – one-twelfth of the number of households in the commune, the latter being obtained from commune records. No blocking was done within the commune, so the block size was the number of households in the commune to be interviewed, rounded up to the nearest multiple of four. A seed of 1818 used was in the first

[2] Most officials expected the subsidy to have a greater impact than the information intervention. Interestingly, the higher the level of the official, the more optimistic they are about the two interventions raising enrolment rates. Officials in Hanoi expected the combined intervention to raise enrollment rates by 20 percentage points at the minimum; two expected much larger effects, one 50 percent, the other 70-80 percent.

[3] Because households without a target member were not replaced (see footnote 1), we ended up with fewer than the 600 households per arm that we anticipated (440 on average per arm). Our ICC was also somewhat optimistic: the actual ICC turned out to be 0.3 rather than 0.2. On the other hand, we averaged 3.09 eligible members per household rather than the assumed 3.0 and had a much smaller than expected loss-to-follow-up. On balance, however, the differences between our assumptions and practice reduced our power, and we ended up with power of 0.69 in the cases of groups II and III. Our power in the case of group IV (with double the target difference) was still safely in excess of 0.8.

[4] https://www.sealedenvelope.com/freerandomiser/v1/lists.

commune, 1819 was used in the second, and so on. The enumerator knew the household's assignment before the start of the baseline interview, but the respondent learned if they had been assigned to one of the treatment groups only at the end of the interview.

*Statistical methods*

The effect of an intervention was estimated through a comparison of the enrollment odds ratios for eligible individuals assigned the intervention and eligible individuals in the control group. Estimation was via a logistic regression of enrollment status at the endline survey on a series of dummy variables capturing which of the three groups the individual had been assigned to in the baseline. Standard errors were adjusted for clustering at the household level. Adjusted effects were obtained by re-running the logistic regression including – in addition to the treatment dummy variables – the endline values of the covariates listed in Table 1; we also include enrollment status in the baseline, except in the ancillary results in which we analyze separately those with and without insurance in the baseline.

*Data*

Our data were from baseline and endline household surveys designed by us and modeled loosely on the Vietnam Household Living Standards Survey (VHLSS). We changed the questions asking how households found the money to pay for health care, and produced a slimmed-down version of the VHLSS consumption module building on the work of Beegle et al. (2012) in Tanzania; our list of consumption items accounts for 70 percent of consumption spending in the 2010 VHLSS sample.

## Results

*Participant flow, eligibility and attrition*

Figure 1 shows the participant flow during the study. We obtained a roughly similar number of households in each group; the differences reflect the fact that the online randomization tool would produce exactly the same numbers in each group only when the number of households to be interviewed is divisible by four. Thirteen percent (387) of the 3,002 households interviewed had no member eligible for the voluntary health insurance scheme; these households were not replaced, and were discarded, leaving 2,615 eligible households. Not all of the 9,965 members of these households were eligible for the voluntary health insurance: a total of 5,190, giving us roughly 1,300 eligible individuals in each group. Of these 5,126 also had their particulars recorded in the endline survey. The attrition rate between the baseline and endline surveys (in terms of eligible individuals) is just over 1 percent, well below our assumed rate.

*Baseline values and inter-group differences*

Table 1 shows the baseline enrollment rates among eligible individuals across the four groups: they are around 3-4 percent with no significant differences between the treatment groups and the control group. The discrepancy between the official 26 percent coverage rate quoted in the Introduction and our rate is likely to be due in part to the fact that our figure captures only enrollment in the voluntary scheme and is based on household survey data; a previous estimate (Lieberman and Wagstaff 2009) similarly derived but for 2006 was also around 3 percent. Also shown are the mean values of several variables that we hypothesize (on the basis of previous empirical work) could influence the health insurance enrollment decision. The p-values are relevant to testing the significance of

differences between the group and the control group. Table 1 reveals a high degree of balance on observables between the control and three treatment groups: there is just one variable where there is a significant difference with the control group at the 5 percent level.

*Intervention impacts*

Our main results are shown in the top left part of Table 2. None of the three interventions had a statistically significant effect on enrollment. The effect size is also small: a 0.7 percentage point increase for the combined information and subsidy intervention, an 11 percent increase (odds ratio 1.11; 85% CI 0.77-1.61). The top right part of Table 2 shows the adjusted effects: the effect sizes are much the same as the unadjusted effect sizes, and none is anywhere near being statistically significant. Also shown in the top panel of Table 2 are the effects obtained when groups I and II are pooled, and groups III and IV are pooled. Again, no significant effect is evident.

Table 2 also shows the effect sizes for subsamples. We see larger effect sizes in the two information interventions among those who were enrolled in the voluntary scheme in the baseline. In the information-only intervention (Group I), we see a 24 percentage point or 61 percent increase which is borderline significant at the 5 percent level (adjusted odds ratio: 3.16, 95% CI 1.00-10.06). The combined intervention (Group IV) in the unadjusted results has a similar sized effect, although it is statistically significant only at the 6 percent level and not in adjusted results (adjusted odds ratio: 2.29, 95% CI 0.66-7.96). The effects of all three interventions among those not enrolled at the baseline are tiny by comparison, and none is statistically significant.

We also see larger effects for individuals who, in the endline data, report chronic sickness or say their health is “less than good”. In the latter group, we see especially

pronounced effects (adjusted odds ratio: 2.47, 95% CI 1.21-5.06). Among those reporting chronic sickness, the effect of the combined intervention is smaller, and is significant only at the 10 percent level, and only in the adjusted results (adjusted odds ratio: 1.75, 95% CI 1.03-2.98).

**Discussion**

Our results serve as a reminder of the often low enrollment rates in voluntary health insurance, but also suggest that there may be limited scope to raise enrollment rates through information campaigns and subsidies. Our combined information-subsidy intervention raised enrollment by around 10 percent but not significantly, and given the very low baseline enrollment rate over 90 percent of the eligible individuals in our sample were still uninsured after receiving both interventions. Interestingly, in the survey of government officials we undertook prior to analyzing the data, officials at the local level successfully anticipated muted effects of our two interventions, while officials from central government expected much larger effect sizes.

Our ancillary results contain two stark warnings. We find large and borderline significant effects of the information interventions among those who had voluntary insurance in the baseline but (inevitably given the aggregate results) not among those who did not. Our information interventions raised re-enrollment rates above what they would otherwise have been, suggesting that at best information interventions may prevent dis-enrollment among those already enrolled but do not entice new enrollees. The second stark warning is that our results reinforce concerns about 'adverse selection' in voluntary health insurance. In analyses of our baseline data not reported in the paper, we see higher enrollment rates – other things equal – among the less healthy. Our experimental results

suggest that subsidies and information exacerbate this problem by encouraging enrollment by "bad" risks but not "good" risks.

Some potential limitations of the study are worth discussing. First, the lack of significance of our effects may reflect in part our sample size: our experiment lacked the power to detect the small effects the interventions produced, and had our sample been much larger, we might well have found statistically significant effects. That said while statistical power matters, it is the effect sizes that guide policy; statistically significant small effects would not have altered the substantive conclusions about the ineffectiveness of information and subsidies in raising voluntary enrollment rates and tackling the tendency of voluntary schemes to suffer from adverse selection. This is why when thinking about sample size we used 'importance' as our criterion when deciding on target differences between the intervention and control groups (cf. Hislop et al. 2014). Second, our results could have been different if we had opted instead for a 50 percent subsidy rather than a 25 percent one. It may well be the case that even with a 25 percent subsidy the money and time costs associated with voluntary enrollment outweigh the perceived benefits. And we do know from other RCTs that the size of incentive can matter: de Walque et al. (2012), for example, in their RCT of financial incentives to stay from sexually-transmitted infections found that an effect of incentives only at the higher of the two incentive levels implemented.

Overall our results provide little by way of encouragement for policy makers in Vietnam – or anywhere else – who are trying to fill UHC's "missing middle" by using information and subsidies to boost the demand for voluntary health insurance.

Figure 1: Flow of participants during study

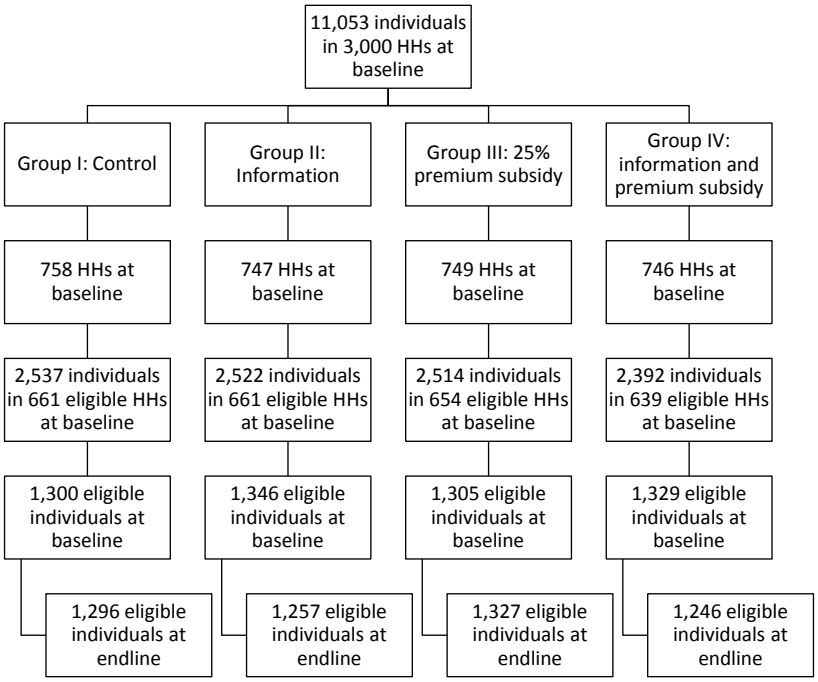
11,053 individuals in 3,000 HHs at baseline
Group I: Control
Group II: Information
Group III: 25% premium subsidy
Group IV: information and premium subsidy
758 HHs at baseline
747 HHs at baseline
749 HHs at baseline
746 HHs at baseline
2,537 individuals in 661 eligible HHs at baseline
2,522 individuals in 661 eligible HHs at baseline
2,514 individuals in 654 eligible HHs at baseline
2,392 individuals in 639 eligible HHs at baseline
1,300 eligible individuals at baseline
1,346 eligible individuals at baseline
1,305 eligible individuals at baseline
1,329 eligible individuals at baseline
1,296 eligible individuals at endline
1,257 eligible individuals at endline
1,327 eligible individuals at endline
1,246 eligible individuals at endline

Table 1: Baseline characteristics of participants

| | I: Control group | II: Information | | III: Premium subsidy | | IV: Information and premium subsidy | |
|---|---|---|---|---|---|---|---|
| | mean | mean | p-value | mean | p-value | mean | p-value |
| Enrolled | 0.038 | 0.038 | 0.985 | 0.047 | 0.309 | 0.029 | 0.293 |
| Household size | 3.998 | 3.931 | 0.427 | 3.964 | 0.682 | 3.887 | 0.177 |
| No. eligible household members | 2.357 | 2.397 | 0.605 | 2.296 | 0.389 | 2.259 | 0.169 |
| Household head is male | 0.901 | 0.911 | 0.564 | 0.866 | 0.066 | 0.889 | 0.507 |
| Annual per capita consumption (thousand VND) | 9831 | 10032 | 0.527 | 9850 | 0.960 | 9675 | 0.564 |
| Annual per capita out-of-pocket health spending (thousand VND) | 863 | 1138 | 0.174 | 916 | 0.690 | 732 | 0.268 |
| Education - illiterate | 0.012 | 0.013 | 0.933 | 0.013 | 0.970 | 0.019 | 0.389 |
| Education - primary | 0.204 | 0.189 | 0.560 | 0.201 | 0.902 | 0.153 | 0.037 |
| Education - lower secondary | 0.587 | 0.610 | 0.446 | 0.568 | 0.533 | 0.625 | 0.208 |
| Education - upper secondary | 0.112 | 0.101 | 0.546 | 0.120 | 0.696 | 0.120 | 0.695 |
| Education - vocational & college | 0.034 | 0.047 | 0.231 | 0.035 | 0.871 | 0.036 | 0.812 |
| Education - other | 0.051 | 0.040 | 0.394 | 0.064 | 0.388 | 0.047 | 0.785 |
| Age | 42.3 | 41.9 | 0.567 | 42.7 | 0.450 | 43.1 | 0.149 |

Table 2: Effects of interventions on enrollment

| | Enrollment rate | Odds ratio and 95% CI | p-value | Adjusted odds ratio and 95% CI | p-value | Intracluster correlation |
|---|---|---|---|---|---|---|
| *Full sample* | | | | | | |
| I: Control group | 82/1296 (6.3%) | | | | | 0.421 |
| II: Information | 79/1257 (6.3%) | 0.99 (0.68-1.44) | 0.970 | 0.94 (0.63-1.41) | 0.773 | 0.257 |
| III: Premium subsidy | 96/1327 (7.2%) | 1.16 (0.81-1.65) | 0.429 | 1.12 (0.76-1.66) | 0.559 | 0.300 |
| IV: Information and premium subsidy | 87/1246 (7%) | 1.11 (0.77-1.61) | 0.579 | 1.15 (0.77-1.72) | 0.490 | 0.377 |
| I & II combined | 161/2553 (6.3%) | | | | | |
| III & IV combined | 183/2573 (7.1%) | 1.14 (0.88-1.47) | 0.319 | 1.18 (0.90-1.55) | 0.246 | |
| *Subsample enrolled at baseline* | | | | | | |
| I: Control group | 17/43 (39.5%) | | | | | |
| II: Information | 29/46 (63%) | 2.61 (0.98-6.94) | 0.055 | 3.16 (1.00-10.06) | 0.051 | |
| III: Premium subsidy | 24/56 (42.9%) | 1.15 (0.47-2.78) | 0.761 | 1.15 (0.41-3.25) | 0.785 | |
| IV: Information and premium subsidy | 21/33 (63.6%) | 2.68 (0.96-7.48) | 0.060 | 2.29 (0.66-7.96) | 0.191 | |
| *Subsample not enrolled at baseline* | | | | | | |
| I: Control group | 65/1253 (5.2%) | | | | | |
| II: Information | 50/1211 (4.1%) | 0.79 (0.51-1.22) | 0.280 | 0.77 (0.50-1.20) | 0.250 | |
| III: Premium subsidy | 72/1270 (5.7%) | 1.10 (0.74-1.64) | 0.644 | 1.16 (0.77-1.73) | 0.479 | |
| IV: Information and premium subsidy | 66/1213 (5.4%) | 1.05 (0.70-1.59) | 0.812 | 1.03 (0.68-1.57) | 0.874 | |
| *Subsample reporting chronic sickness* | | | | | | |
| I: Control group | 37/429 (8.6%) | | | | | |
| II: Information | 38/411 (9.2%) | 1.08 (0.66-1.76) | 0.760 | 1.11 (0.65-1.89) | 0.716 | |
| III: Premium subsidy | 46/449 (10.2%) | 1.21 (0.75-1.96) | 0.439 | 1.34 (0.78-2.30) | 0.295 | |
| IV: Information and premium subsidy | 47/412 (11.4%) | 1.36 (0.85-2.20) | 0.203 | 1.75 (1.03-2.98) | 0.038 | |
| *Subsample reporting health "not good"* | | | | | | |
| I: Control group | 18/218 (8.3%) | | | | | |
| II: Information | 24/206 (11.7%) | 1.47 (0.75-2.86) | 0.263 | 1.06 (0.50-2.24) | 0.882 | |
| III: Premium subsidy | 21/239 (8.8%) | 1.07 (0.54-2.13) | 0.846 | 0.85 (0.39-1.88) | 0.692 | |
| IV: Information and premium subsidy | 33/203 (16.3%) | 2.16 (1.13-4.14) | 0.021 | 2.47 (1.21-5.06) | 0.013 | |

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