Published by Oxford University Press in association with The London School of Hygiene and Tropical Medicine *Health Policy and Planning* 2010;**25**:145–154

doi:10.1093/heapol/czp044

Community health insurance in Gudalur, India, increases access to hospital care

Narayanan Devadasan,[1,2]* Bart Criel,[3] Wim Van Damme,[3] S Manoharan,[4] P Sankara Sarma[2] and Patrick Van der Stuyft[3]

Accepted 12 August 2009

Background To reduce the burden of out-of-pocket payments on households in India, the government has introduced community health insurance (CHI) as part of its National Rural Health Mission. Indian CHI schemes have been shown to provide financial protection and have the potential to improve quality of care, but do not seem to improve access. This study examines this dimension of CHI performance and explores conditions under which a CHI scheme can improve access to hospital care for the poor.

Methods We conducted a panel survey at the ACCORD-AMS-ASHWINI (AAA) CHI scheme in India. The AAA CHI scheme protects the poorest sections of society against hospitalization expenses. 297 insured and 248 matched uninsured households were observed by village volunteers on a weekly basis for 12 months. Any patient presenting with a 'major ailment' in these households was interviewed using a structured questionnaire. Outcomes measured were utilization of hospital services, cost of treatment and quality of treatment received.

Results The two cohorts were similar regarding demographic, social and economic parameters. More insured than uninsured households expressed trust in the CHI scheme organizers. Both groups had similar levels of minor ailments, but the insured had higher incidence of chronic and major ailments. Insured patients had a hospital admission rate 2.2 times higher than uninsured patients, independent of confounding factors. This higher rate among the insured was also found in children and those with pre-existing conditions. Vulnerable sections of the insured population—children, pregnant women, the poorest—had the highest admission rates. Most admissions, in both cohorts, took place in the ASHWINI hospital. Credible and trustworthy organizers, effective providers, low co-payments, and low indirect costs contributed to this result.

Conclusions A well-designed CHI scheme has the potential to improve access to hospital care, even for vulnerable sections of the community—the poorest, individuals with pre-existing conditions like diabetes and hypertension, and pregnant women.

Keywords Community health insurance, India, utilization, access to care

[1] Institute of Public Health, Bangalore, India.
[2] Achutha Menon Center for Health Science Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum, Kerala, India.
[3] Department of Public Health, Institute of Tropical Medicine, Antwerp, Belgium.
[4] Action for Community Organisation, Rehabilitation and Development (ACCORD), Gudalur, Nilgiris, India.
* Corresponding author. Institute of Public Health, 250, 2nd C Main, Girinagar 1st Phase, Bangalore, India – 560085. Telefax: +91–8026421929. E-mail: deva@iphindia.org

KEY MESSAGES

- The community health insurance (CHI) scheme has increased the use of hospital care for the insured compared with the uninsured, independent of confounding factors such as distance, socio-economic status and pre-existing morbidity patterns.
- This increase was consistent even among the poorest, children and pregnant women, highlighting the capacity of CHI schemes to protect the vulnerable.

Background

Out-of-pocket payments by individual households to access curative care in the private sector constitute 72% of the total health expenditure in India (Ministry of Health & Family Welfare 2006). This level of out-of-pocket payment is one of the highest in the world (WHO 2006). Out-of-pocket payments have two consequences: they constitute a formidable barrier to accessing health care, and high medical expenses impoverish households. Surveys show that 5% of Indians do not access health care due to financial reasons (National Sample Survey Organisation 2006), 40% of patients have to borrow or sell assets to meet hospital expenses (Ministry of Health & Family Welfare 2005), and 24% of patients are impoverished due to hospitalization expenses (Peters *et al*. 2002).

The government of India has recognized this problem and is working on both the supply and the demand sides. On the supply side, it is planning to double the government budgetary allocations for health, from the current 0.9% of GDP to at least 2% (*Times of India 2006*). It hopes that this will result in better funded and hence better performing government health services. At the same time, it is trying to improve health insurance coverage, so that more Indians are protected against high medical costs. The National Health Policy of 2002 has recommended introducing health insurance (Ministry of Health & Family Welfare 2002). The recently launched National Rural Health Mission has strongly recommended that rural populations be covered by risk-pooling mechanisms, especially by community health insurance (Ministry of Health & Family Welfare 2005).

Community health insurance (CHI) is not a new phenomenon in India. The oldest scheme is more than 50 years old. Currently there are more than 100 such schemes in India, most of them initiated by non-governmental organizations (NGOs). The main objectives of these schemes are to improve access to health care and to protect households from high medical expenditures (Devadasan 2005). They typically cover between 20 and 40% of their target population; the number of members ranges from 1000 to 100 000. Most of the CHI schemes cover hospitalization services in private or NGO hospitals. Administration responsibilities are shared between the community and the NGO (Devadasan *et al*. 2006). Many CHI schemes have linked up with formal insurance companies to expand the risk pool and make the scheme more sustainable (Devadasan *et al*. 2004).

Given the political will of the government it should be possible to expand the CHI movement and cover more people. However, before doing so, it would be wise to ask some basic questions. Do these CHI schemes perform? Do they increase access to health care? Do they protect the households from catastrophic health expenditures? Most importantly, what are the conditions necessary for them to meet the basic health insurance functions (Kutzin 1998)? Answers to these questions will allow governments to create an enabling context for a successful CHI movement.

Data about the ability of CHI schemes to improve access to health care is limited. Internationally, while there is considerable evidence from Africa about CHI and access to care, most of it is based on data collected at the facility level (Criel *et al*. 1999; Ekman 2004). There is little empirical evidence from community-based research. Baeza, in his review of 258 pre-payment schemes, shows that only 14 out of 24 studies had evidence of increased access to health care. Of these, only one was a methodologically sound study (Baeza *et al*. 2002). More recent field-based evidence from Rwanda (Schneider and Diop 2004), Senegal (Jütting 2003), and the Philippines (Dror 2005) has indicated that CHI schemes do increase access to primary and secondary health care. In Rwanda, utilization of outpatient services by the insured was three times higher than by the uninsured, though the former had lower incidence of ailments. In Senegal, a household survey showed that the probability of insured members using hospital services increases compared with the uninsured. Pregnant women and the elderly particularly benefit from insurance. Dror, in his study in the Philippines, documented an increase in the utilization of hospital services by the insured in comparison with the uninsured. Further, institutional deliveries were higher among the insured.

The situation is similar in India and the evidence is equivocal (Ranson 2003). While most schemes have data about coverage, very few have information on utilization, on finances, or on other performance indicators. Ranson's study of the Vimo SEWA (Self Employed Women's Association) programme indicates that there was no difference in the utilization rate of hospital services between the insured and uninsured (Ranson 2004). An institution-based study from India, however, demonstrated an increase in hospital admissions among the insured compared with the uninsured (Devadasan *et al*. 2004). A report from RAHA, a CHI scheme in east India, suggests that while utilization of ambulatory care was 2–10 times higher among the insured, there was no discernable difference in hospital admission rates between the two categories.[1] A recent study, again from Vimo SEWA, indicates that even among the insured, the better-off have higher access to health care compared with the poor (Ranson *et al*. 2006).

We studied whether the ACCORD–AMS–ASHWINI[2] (AAA) CHI scheme increased access to hospital care for the insured population and whether this increase was specifically due to insurance status.

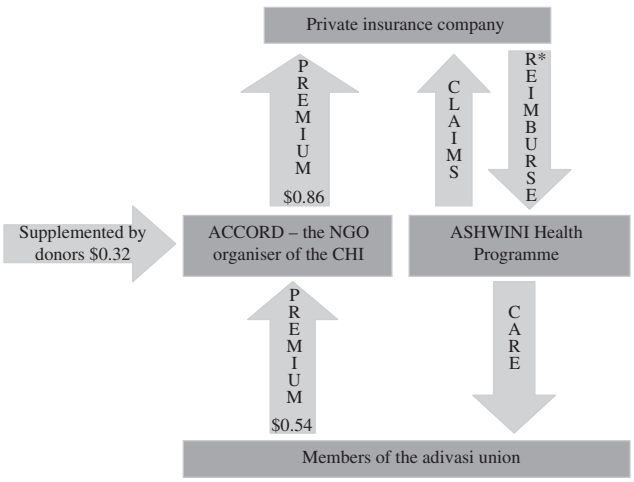
The ACCORD–AMS–ASHWINI community health insurance scheme

This scheme is located in Gudalur, a densely forested and mountainous sub-district in Tamil Nadu, India. There were a total of 215 269 inhabitants in 2001 in Gudalur (Government of Tamil Nadu 2001). Of these, 14 149 were adivasis, or indigenous people. These adivasis were hunters and food gatherers till 50 years ago. Today they are mostly wage labourers and are one of the poorest sections of Indian society, defined by the government of India as 'vulnerable tribal groups'. The adivasis of Gudalur are organized into a union, the Adivasi Munnetra Sangam (AMS), which fights for their rights. As of June 2004, 3138 households in Gudalur were members of the AMS.

The economy in Gudalur is plantation based, with tea being the main crop. In July 2004, there were five NGO hospitals, three government hospitals, two private hospitals and three estate hospitals in the sub-district, six of which were in Gudalur itself. Only ASHWINI hospital provided the four basic speciality services: general medicine, surgery, obstetrics and paediatrics.

The AAA CHI scheme was initiated in 1992 by ACCORD, a local NGO engaged in overall development of the adivasis. The CHI scheme's main objective was to improve access to hospital care for the adivasis living in the Gudalur sub-district (Devadasan *et al*. 2004).

All AMS members were eligible to join the AAA CHI scheme (Figure 1). To join, each member had to pay a premium of Rs 25 (US$0.54) per person per year during a definite collection period. This premium was collected by the ACCORD field staff and the AMS leaders. Insured members, if hospitalized in the ASHWINI hospital, were entitled to care after payment of a small fee of Rs 10 (US$0.22) per admission. Uninsured AMS members had to meet the costs of medicines (US$2–5), while non-adivasi patients had to pay the entire hospital bill (US$15–20). ASHWINI hospital in turn had insured all the AMS members with a formal insurance company through external resources. The company reimbursed ASHWINI for the hospitalization expenses of AMS members, up to a maximum of Rs 2500 (US$54) per insured patient per year. This entire CHI scheme was jointly managed by ACCORD and ASHWINI staff and AMS leaders. Primary care was provided free to all adivasis, irrespective of their insurance status, by ASHWINI health staff at the village and health centre levels.



* Reimbursement of hospitalization expenses, up to a maximum of US$54.

Figure 1 The design of the ACCORD-AMS-ASHWINI community health insurance scheme

Methods

The AMS list of members on 1 July 2004 was the sampling frame. The households were sorted according to villages and each of the households was given a unique number. Then the list was divided into two broad groups: insured and uninsured. There were a total of 972 (30%) insured households and 2205 uninsured households. A random number was generated using MS Excel©. This was the first insured household selected. Subsequently, every third household from the above number was selected systematically to form the 'insured' sample. This amounted to 324 households. The research team visited each of these 324 households. Twelve households had migrated to Kerala, leaving 312. Each of these was requested to enrol for the study, of which 305 consented.

For each insured household recruited in the study, we then identified an uninsured household with similar characteristics. The six main characteristics that we matched were:

- Type of house—a proxy indicator for economic status
- Availability of land—a proxy indicator for economic status
- Adivasi subgroup—a proxy indicator for social status
- Village—an indicator of distance from the provider
- Family size—a proxy indicator of the age of the family members
- Age of head of household—a proxy indicator of the age of the family members.

We used a snowball technique to identify the uninsured household, asking the selected insured household to identify an uninsured household that had the above six characteristics similar to theirs. When they identify a household, the researcher visited this uninsured household and checked to see if all the six elements matched. If they matched, then the uninsured household was requested to join in the study. If they did not match, this uninsured household was requested to identify another uninsured household with the six specific characteristics. In this way, a total of 263 matched uninsured households were sampled.

In order to document households' demographic and socio-economic profile, a structured baseline questionnaire was administered by a trained interviewer to those enrolled households who had an adult present at the time of the visit: 297 insured and 248 uninsured households. Each of these insured and uninsured households was then followed on a weekly basis from 1 July 2004 to 30 June 2005 by village volunteers. During their weekly visits, the volunteers recorded the presence or absence of any illness in the past week on a pre-printed questionnaire. While recording, these volunteers also classified the illness as a minor ailment, chronic ailment or major ailment (see definition below). These questionnaires were handed over

to a supervisor at the beginning of each month. The supervisor reviewed them and notified trained interviewers if there was a major ailment in any of the households. An interviewer then administered a third structured questionnaire to the patients presenting with major ailments. The elements investigated were utilization of hospital services, cost of treatment, and perceived quality of care received. All three questionnaires were piloted and modified when necessary.

All illnesses were classified as minor, chronic or major ailments. The last was defined as '*any illness of acute onset that was of more than three days duration* **and** *affected activities of daily living;* **or** *any illness necessitating an admission of more than 24 hours;* **or** *any fatal illness*' (Gertler and Gruber 2002). A chronic ailment was defined as any ailment lasting longer than 30 continuous days. A minor ailment was by default any ailment of sudden onset which did not affect the activities of daily living for more than 3 days and lasted less than 30 days. A patient could have different types of ailments at the same time.

An insured member was defined as an AMS member who had paid the premium of Rs 25 (US$0.54) for the period from July 2004 to June 2005. A household with more than 50% of its members insured was considered to be an insured household.

Access to hospital care was measured using a proxy indicator—admission in a hospital for more than 24 hours. Details of the admission were obtained by interviewing the patients with major ailments and were supplemented with information from hospital records.

Double entry of the data was done in MS Access© and the data were analysed using SPSS for Windows version 10. Chi-square (χ^2) tests and the Mann Whitney test were used in stratified analysis to assess the differences in admission between the insured and uninsured as a function of nominal and continuous potential determinants, respectively. Associations were quantified using risk or odds ratios and 95% confidence intervals. To control for confounding we constructed two logistic regression models with (as dependent variables) admission in hospital for all subjects in the study population and admissions for people experiencing major ailments, respectively. Independent variables considered for entry in the models were the factors found significant in the stratified analysis and potential determinants deemed important on *a priori* grounds. The model was built by iterative backward elimination and forward selection, and significantly independent risk factors ($P < 0.05$) as well as not significant but confounding variables were retained in the final model.

Results

A total of 305 insured and 263 uninsured households, with 1440 and 1229 individuals respectively, enrolled in the study (Table 1). The difference between the number of insured and uninsured households existed because in one area (Devarshola) a majority of the households were insured, and it was not always possible to find matched uninsured households. However, there was no major difference in key characteristics between the matched and unmatched insured households. Of the enrolled households, 297 insured and 248 uninsured households (1409 and 1177 individuals, respectively) were administered the baseline questionnaire at the beginning of the study. The rest were not interviewed because no adult members were present in the household at the time of the visit. In this paper, we only present findings about those households that had baseline information.

These 545 households were followed regularly over 12 months. However, data for 13% of the households was missing for the last month. This was because of a combination of migration ($n = 33$) and misplacement of some forms in three villages ($n = 38$).

Table 1 shows some of the basic characteristics of the insured and uninsured households. There was no statistical difference between the insured and uninsured households for the matched parameters. The mean age, the mean family size, the proportion of females and the proportion of literates were similar in both the insured and uninsured samples. The economic status among the insured and uninsured samples was also similar. The median incomes (95% CI) for the insured and uninsured were US$620 (579, 662) and US$591 (559, 623), respectively. While there appears to be more people of higher income in the insured group, this difference is not statistically significant. Also, it must be seen in a context where more than half of both insured and uninsured families live on less than US$0.50 per capita per day. Even the top quintiles earn less than US$2.0 per capita per day. One interesting but not surprising finding was that the insured had more faith in the organizers of the CHI, i.e. ACCORD, AMS and ASHWINI, than the uninsured.

Morbidity

Fifty-seven per cent of insured and 58% of uninsured individuals had at least one episode of minor ailment during the 12 months that they were followed up (Table 2). Insured individuals with minor ailments had a slightly higher number of episodes compared with the uninsured. The median number (95% CI) of episodes of minor ailments per patient were 2 (1.82, 2.18) and 2 (1.89, 2.11) for the insured and uninsured, respectively. In both categories, children, women and the poorest quintiles had a higher incidence. A total of 65 insured patients had chronic ailments. The corresponding figure for uninsured patients was 18, indicating that chronic patients enrolled in the scheme at a higher rate than other patients. As expected, the incidence of chronic ailments was significantly higher in the elderly. There was no relationship between the incidence of chronic ailments and gender or the income of the household.

A total of 191 (14%) insured individuals and 88 (8%) uninsured individuals had 'major' ailments. This difference was highly significant. Patients with pre-existing conditions (chronic ailments plus pregnant women) may have contributed to a sizable portion of these serious patients. Detailed analysis of those with major ailments shows that the insured uniformly had a higher incidence of major ailments (Table 3). This difference was statistically significant in children, adults, men, the poorest, the richest and the illiterate. Children aged 6–15 had a higher number of serious illnesses because of an outbreak of chicken pox. The higher incidence of major illnesses among the men was mainly due to injuries incurred at the work place.

Table 1 Characteristics of the sampled households of the ACCORD community health insurance scheme (insured and uninsured), July 2004

	Insured	Uninsured
No. of households enrolled (individuals)	305 (1440)	263 (1229)
No. of households with baseline characteristics (individuals)	297 (1409)	248 (1177)
Mean family size (95% CI)	4.8 (4.6, 5.0)	4.8 (4.6, 5.0)
Mean age of individuals[a] (95% CI)	24.7 (23.9, 25.6)	23.9 (23.0, 24.9)
No. (%) of individuals by age group[a]		
0–5 years	185 (14%)	154 (14%)
6–15 years	256 (19%)	227 (21%)
16–45 years	746 (56%)	617 (56%)
>45 years	161 (11%)	103 (9%)
No. (%) of individuals by gender		
Male	651 (48%)	526 (48%)
Female	698 (52%)	574 (52%)
No. (%) of individuals (>6 years) who are illiterate	517(45%)	447 (48%)
No. (%) of families by social status [b]		
Low	167 (56%)	155 (63%)
Not low	130 (44%)	92 (37%)
Median annual income (95% CI) in US$	620 (579, 662)	591 (559, 623)
No. (%) of households by income quintiles		
Low income (Q1 + Q2)	116 (39%)	101 (41%)
Middle income (Q3)	52 (18%)	58 (23%)
High income (Q4 + Q5)	129 (43)	89 (36%)
No. (%) of families for whom the travel time to Gudalur is		
≤1 hour	180 (61%)	147 (59%)
>1 hour	117 (39%)	101 (41%)
Proportion of households who trust ASHWINI hospital	98%	84%

[a]Age and sex data missing in 61 insured individuals and 76 non-insured individuals.
[b]Status of one uninsured family is missing.

Table 2 Morbidity patterns among insured and uninsured sample for the period 1 July 2004 – 30 June 2005

	Insured ($n = 1409$)	Uninsured ($n = 1177$)	RR/OR	95% CI
Incidence rate for minor ailments: episodes per person year (n)	2.1 (2961)	1.8 (2092)	1.18	1.07, 1.30
Proportion of individuals with 1 or more episodes of minor ailments (n)	57% (799)	58% (678)	0.96	0.82, 1.13
Proportion of individuals with chronic ailments (n)	5% (65)	2% (18)	3.11	1.79, 5.47
Incidence rate for major ailments: episodes per 100 person years (n)	15.3 (216)	8.4 (99)	1.97	1.52, 2.56
Proportion of individuals with 1 or more episodes of major ailment (n)	14% (191)	8% (88)	1.94	1.48, 2.55

RR = risk ratio.
OR = odds ratio.
CI = confidence interval.

This also explains why there were many patients without minor ailments but who suddenly developed a major ailment.

Admissions

Among individuals with major ailments, 130 (10%) insured and 42 (4%) uninsured individuals were admitted to hospital (Table 4). The admission rate was more than 2.5 times higher for the insured compared with the uninsured. The proportion of individuals admitted was consistently higher among the insured across all categories. This difference was accentuated among insured children. Surprisingly, the lowest quintile of insured households had the one of the highest admission rates; and this difference was significant (Figure 2). This higher

Table 3 Major ailments by selected characteristics during the period 1 July 2004 – 30 June 2005

	Insured ($n=1409$)	Uninsured ($n=1177$)	OR	95% CI
Proportion of individuals with major ailments by age group (n)*				
0–5 years	17% (31)	10% (15)	1.87	0.93, 3.80
6–15 years	12% (30)	4% (10)	2.88	1.31, 6.47
16–45 years	14% (107)	9% (53)	1.78	1.24, 2.56
>45 years	14% (22)	9% (9)	1.65	0.69, 4.07
Proportion of individuals with major ailments by gender (n)*				
Male	13% (86)	5% (29)	2.64	1.67, 4.19
Female	15% (104)	10% (58)	1.54	1.08, 2.21
Proportion of individuals with major ailments by social status (n)*				
Social status – low	15% (116)	9% (65)	1.73	1.24, 2.42
Social status – not low	12% (74)	5% (22)	2.58	1.54, 4.36
Proportion of individuals with major ailments by literacy (n)				
Illiterate	15% (80)	8% (36)	2.09	1.35, 3.24
Literate	11% (73)	7% (34)	1.70	1.09, 2.67
Not applicable (children <7 years)	17% (31)	10% (15)		
Proportion of individuals with major ailments by income status (n)				
Low income (Q1 + Q2)	14% (71)	8% (40)	1.80	1.17, 2.76
Middle income (Q3)	15% (33)	10% (27)	1.59	0.89, 2.83
High income (Q4 + Q5)	13% (87)	5% (21)	2.84	1.69, 4.79
Proportion of individuals with major ailments by distance from hospital (n)				
≤1 hour	14% (117)	8% (53)	1.94	1.36, 2.77
>1 hour	13% (74)	7% (35)	1.94	1.25, 3.03
Proportion of individuals with major ailments by presence of minor ailment (n)				
No minor ailment	12% (75)	4% (20)	3.36	1.97, 5.77
Minor ailment present	14% (116)	10% (68)	1.52	1.09, 2.12
Proportion of individuals with major ailments by presence of chronic ailment (n)				
No chronic ailment	12% (164)	7% (81)	1.85	1.39, 2.47
Chronic ailment present	41% (27)	39% (7)	1.12	0.34, 3.71
Proportion of individuals with major ailments by presence of pre-existing condition (n)				
No pre-existing condition	11% (147)	6% (75)	1.73	0.84, 3.61
Pre-existing condition present	100% (44)	100% (13)		

OR = odds ratio.

CI = confidence interval.

*Data about age, gender and social status missing from one insured and one uninsured patient.

Table 4 Hospital admission of insured and uninsured individuals during the period 1 July 2004 – 30 June 2005

	Insured ($n=1409$)	Uninsured ($n=1177$)	OR	95% CI
Proportion of individuals admitted in a hospital (n)	9.2% (130)	3.6% (42)	2.75	1.92, 3.92
Proportion of people admitted by age group				
0–5 years	13.0%	5.2%	2.72	1.18, 6.24
6–15 years	5.5%	0.9%	6.51	1.46, 28.95
16–45 years	10.5%	4.4%	2.55	1.62, 4.01
>45 years	8.1%	3.9%	2.17	0.69, 6.86
Proportion admitted by gender				
Male	9.0%	3.2%	2.98	1.71, 5.18
Female	10.0%	4.2%	2.56	1.59, 4.12
Proportion admitted by social status				
Social status – low	10.2%	4.5%	2.39	1.55, 3.68
Social status – not low	8.7%	2.4%	3.94	1.98, 7.84
Proportion admitted by literacy				
Illiterate	10.8%	3.6%	3.27	1.85, 5.79
Literate	6.9%	3.3%	2.16	1.20, 3.88
Not applicable (children <7 years)	12.8%	5.1%		
Proportion admitted by income quintiles				
Low income (Q1 + Q2)	10.9%	3.4%	3.47	1.95, 6.15
Middle income (Q3)	10.4%	5.1%	2.14	1.07, 4.26
High income (Q4 + Q5)	7.6%	2.8%	2.93	1.54, 5.54
Proportion admitted by distance to hospital				
≤1 hour	9.7%	3.8%	2.75	1.75, 4.33
>1 hour	8.5%	3.3%	2.73	1.53, 4.87
Proportion admitted by presence of trust				
No	12.0%	3.2%	4.09	0.95, 17.52
Yes	9.1%	3.7%	2.62	1.79, 3.84
Proportion admitted by presence of minor ailments				
No minor ailments	9.5%	1.8%	5.72	2.80, 11.67
Minor ailments present	9.0%	4.9%	1.94	1.26. 2.96
Proportion of individuals admitted by presence of chronic ailments				
No chronic ailments	7.9%	3.3%	2.53	1.73, 3.69
Chronic ailments present	36.9%	22.2%	2.05	0.65, 6.94
Proportion of individuals admitted by pre-existing conditions				
No pre-existing conditions	6.7%	3.0%	2.30	1.55, 3.43
Pre-existing conditions present	88.6%	53.8%	6.69	1.59, 28.04

OR = odds ratio.

CI = confidence interval.

admission rate existed even among those who resided far away from a hospital or who were illiterate. Patients with either no minor ailments or with pre-existing conditions had a higher chance of being hospitalized.

We also reviewed admissions by diagnosis and found that among insured pregnant women, the majority (90%) delivered in a hospital, while among the uninsured, only 45% delivered in a hospital ($\chi^2=8.6$; df = 1). More than two-thirds of all patients, both insured and uninsured, were admitted to the ASHWINI hospital.

Admissions may be influenced by the incidence of major ailments. Since this was higher in the insured sample, could this be the reason for the higher admission rates? To nullify this effect, we analysed the proportion of admissions by incidence of major ailments. The proportion of admissions among those with major ailments was still significantly higher

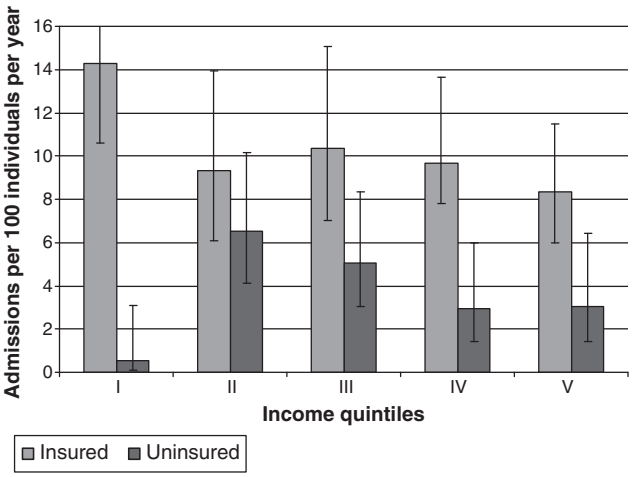


Figure 2 Annual admission rates of insured and uninsured individuals by income quintiles (95% CI)

among the insured (Table 5). While only 44% of uninsured patients with major ailments were admitted, the corresponding figure for the insured was 65%, 1.4 times more. This implies that the probability of admission is nearly 40% more for those with insurance. This probability was higher among children, women, the illiterate and among the lowest income group in the insured households. Those with pre-existing conditions had the highest probability of being admitted.

Admissions to a hospital have various determinants and these can confound each other. However, logistic regression in both the total sample as well as in those persons who had a major illness episode shows that after controlling for confounding, insurance status was a significant determinant. The insured had a more than two-fold increase in odds of admission compared with the uninsured (Table 6). The other main predictor for admission is the presence of pre-existing conditions or chronic ailments. Interestingly, social status and income were not predictive of hospitalization. We could not demonstrate a modifying effect of any of the considered variables.

Discussion

In this panel survey we followed 545 households over 1 year and documented their morbidity and health seeking behaviour to analyse if there was any difference between households with insurance and those without. We used a panel survey to minimize recall bias, especially since this population was mostly illiterate and would have had difficulty recalling events and expenditure amounts. The sampling was adequate, since the matched parameters were comparable in both categories. There was no difference in the demographic profile of the insured and uninsured households. There was also similarity in the social and economic status between these two groups.

The proportion of individuals with minor ailments was similar in both categories. However, there were more patients with chronic ailments and with major ailments in the insured group. This could indicate an element of adverse selection, wherein less healthy individuals are enrolling at a higher rate than healthy individuals. While adverse selection is usually seen as a negative feature because of its financial implications, from a public health perspective, these are the very people who are at high risk and who need health care and financial protection under an insurance mechanism (Criel 1998). Certain design features, like having the family or the village as the enrolment unit or shifting from a voluntary to a mandatory

Table 5 Admissions for major ailments during the period 1 July 2004 – 30 June 2005

	Insured ($n=216$)	Uninsured ($n=99$)	OR	95% CI
Proportion of patients with major ailment admitted (n)	65% (140)	44% (44)	2.30	1.42, 3.74
Proportion of patients admitted by age				
0–5 years	73.0%	42.1%	3.71	1.16, 11.89
6–15 years	43.8%	20.0%	3.11	0.57, 17.02
16–45 years	69.6%	48.3%	2.45	1.28, 4.69
>45 years	60.0%	45.5%	1.80	0.45, 7.25
Proportion of patients admitted by gender				
Male	64.6%	54.5%	1.52	0.68, 3.39
Female	65.3%	38.5%	3.00	1.60, 5.63
Proportion of patients admitted by social status				
Low status	62.5%	44.4%	2.08	1.17, 3.72
Not low status	69.2%	42.3%	3.07	1.23, 7.66
Proportion of patients admitted by literacy status				
Illiterate	67.4%	43.9%	2.64	1.24, 5.62
Literate	57.7%	45.7%	1.62	0.73, 3.61
Not applicable (children <7 years)	73.0%	42.1%		
Proportion of patients admitted by income levels				
Low income (Q1 + Q2)	69.9%	37.0%	3.96	1.85, 8.47
Middle income (Q3)	65.7%	46.7%	2.19	0.80, 5.96
High income (Q4 + Q5)	60.2%	56.5%	1.16	0.46, 2.91
Proportion of patients admitted by distance				
≤1 hour	65.9%	45.8%	2.29	1.22, 4.28
>1 hour	63.1%	42.5%	2.31	1.07, 4.98
Proportion of patients admitted by presence of trust				
No	50.0%	50.0%	1.00	0.14, 7.10
Yes	65.2%	43.7%	2.42	1.45, 4.03
Proportion of patients admitted by presence of minor ailments				
No minor ailments	75.3%	45.8%	3.60	1.40, 9.24
Minor ailments present	58.0%	44.0%	1.76	0.99, 3.12
Proportion of patients admitted by presence of chronic ailments				
No chronic ailments	60.4%	43.2%	2.01	1.20, 3.37
Chronic ailments present	88.2%	54.5%	6.25	1.29, 30.35
Proportion of patients admitted by presence of pre-existing conditions				
No pre-existing conditions	57.7%	43.0%	1.81	1.07, 3.06
Pre-existing conditions present	89.6%	53.8%	7.37	1.76, 30.82

OR = odds ratio.
CI = confidence interval.

Table 6 Independent risk factors for admissions after controlling for confounding factors in logistic regression analysis

Variable	Whole study population		Those with major illness episodes	
	Odds ratio	95% CI	Odds ratio	95% CI
Insurance status (yes)	2.31	1.54, 3.47	2.22	1.31, 3.77
Age group				
0–5 years	–	–	–	–
6–15 years	0.31	0.16, 0.61	0.27	0.11, 0.65
16–45 years	0.60	0.38, 0.94	0.77	0.39, 1.50
>45 years	0.36	0.17, 0.76	0.43	0.17, 1.08
Gender (female)	–	–	0.60	0.35, 1.01
Distance (>1 hour)	0.71	0.48, 1.04	–	–
Presence of minor ailments (yes)	2.10	1.36, 3.24	–	–
Presence of chronic ailments (yes)	6.22	2.90, 13.35	2.36	0.99, 5.63
Presence of pre-existing conditions (yes)	57.61	27.15, 122.26	3.48	1.56, 7.77

enrolment, would minimize the financial implications of adverse selection.

Adverse selection may contribute to the higher incidence of major ailments among the insured, but it cannot be the entire reason. This is because the high incidence of major ailments is uniform across gender, age groups and income quintiles. Also there is no corresponding increase in the proportion of patients with minor ailments. Finally, the number of episodes of major ailments per patient is similar in the two groups. The higher number of patients with major ailments could also be explained by the fact that our definition of 'major ailment' included *patients who have been admitted*. Since there appears to be a higher admission rate among the insured, this may have indirectly contributed to a higher rate of patients with 'major ailments'. A third possible explanation is the fact that we recorded 'reported' illnesses. Amartya Sen highlights one of the flaws of measuring 'reported' illness, mainly that this depends on the perception of the individual and is open to bias (Sen 2002). The poor and especially those living in a resource-poor environment may have a lower perception of ill health, since there is not much that they can do about it. In this study, the uninsured may be more stoic and prefer to continue working rather than stay at home. This could be the reason why even after removing the patients with chronic ailments, the incidence of major ailments in the insured group remains high. This could indicate that the insured households are not only more risk averse but also tend to consider illness as an adverse event in their lives that needs remedy. The contribution of adverse selection needs to be explored further.

The insured had more than twice the rate of admissions than the uninsured. This is striking and indicates that the insured have much more access to hospital care in comparison with the uninsured. Access to health care has many determinants (Igun 1979; Andersen 1995): distance, financial barriers, acceptability of the provider, social and economic class of the patients, and effectiveness of the care provided. In view of the sampling strategy, many of these important determinants of utilization should not substantially confound the relationship between utilization and insurance status. This is supported by our multivariate analysis which clearly shows that insurance status remains an important factor for hospital admissions, after controlling for confounding factors. This indicates that a well-run CHI programme has the potential to remove some of the barriers to health care and improve access. We say some, because we note that as distance increases, the utilization of hospital services decreases independent of insurance status. Probably for those living further away, the benefit of health insurance is offset by the transportation costs. CHI schemes targeting the poor may need to reimburse travel costs if they want to improve access for those living further away. Access was high for insured children, whose admission rate was nearly twice that of the uninsured. A surprising finding has been the ability of the AAA CHI to especially benefit the poorest sections in an overall indigent population. While improved access has been established in other studies, most of them have concluded that the poorest sections fall through the CHI safety net (Bennett *et al*. 1998; Ranson *et al*. 2006). One of the reasons for the AAA scheme's success here could be the fact that it is an entirely cashless system with very low co-payments. This allows an insured patient to walk in and out of a hospital without worrying about expenses. Cash payments, even if reimbursed later, are definitely a financial barrier. They are also a psychological barrier, since patients often state that they are afraid of the unknown bill when they go to a hospital. This is especially true in the Indian context, where fee for service is the normal payment mode.

Also in the AAA CHI scheme, the patient does not have to fill in various forms and submit numerous certificates. These were real barriers for the poor in the Vimo SEWA scheme (Sinha *et al*. 2006). Further, the provider of care, the ASHWINI hospital, is credible and effective and enjoyed the trust of the insured. More than 85% of the insured and two-thirds of the uninsured used the services of ASHWINI, though having a choice of other hospitals. Some of the reasons were: *''this is our hospital''*; *''We get good treatment and good medicines in [the ASHWINI] hospital''*; *''The nurses and doctors treat us well. They speak in our language and explain about the illnesses.''* Yet another reason could be the fact that the benefit package was part of a comprehensive health care programme, so there was continuity of care from the village to the hospital. Exclusions were non-existent, so the insured patient was confident of

getting care when approaching the ASHWINI hospital. This is not the case in many other Indian schemes where exclusions introduce an element of uncertainty at the time of illness.

All this was reinforced by the fact that the CHI scheme was organized by trustworthy organizations like ACCORD and AMS who impact other facets of community life. Trust plays an important part in community health insurance, and this has been hinted about by other authors (Criel and Waelkens 2003). This needs to be explored in more detail since it is an important determinant for the performance of a CHI scheme. It implies that public authorities and institutions wanting to introduce health insurance should be credible and trustworthy. This is relevant in the context where governments with little credibility may want to promote CHI schemes. Health insurance could be an excellent platform for initiating a 'public-private' partnership, where the government provides the stability and its administrative backup, while the NGO (or any other local organization) contributes its integrity and capability in managing the funds.

While the admission rates for the insured are much higher than the national averages (National Sample Survey Organisation 2006), they are similar to those in neighbouring Kerala (Mohindra *et al*. 2005). The obvious explanation is the higher incidence of major ailments among the insured. Another possible explanation could be the presence of moral hazard. Demand-side moral hazard could be one of the explanations for this high admission rate, but the high opportunity cost of travel, food and stay at the hospital indicates that this may be unlikely. Supply-side moral hazard could be yet another explanation of the high admission rate, as there is a financial incentive for the ASHWINI hospital to admit insured patients. But, given the extreme poverty among the adivasis, removing any barrier is a major achievement, especially if it is through a risk-sharing mechanism so that the burden on the individual household is limited. While most CHI schemes are able to achieve horizontal equity or risk solidarity, by charging a flat premium for all, here we see indications that some level of vertical equity or income solidarity was achieved because the richer sections of the risk pool are actually cross-subsidizing the poorer sections.

The context of the AAA CHI scheme should be kept in mind while reviewing the above results. It was developed for a very poor population, and is nested within larger development activities. This, plus the close links that the community has with the various stakeholders, has definitely influenced the output of this CHI scheme. While this may not be totally reproducible in other situations, we can learn important lessons from it.

Conclusions

In this panel survey, we found that insurance status substantially determines utilization of hospital services. Even allowing for some level of adverse selection, there is evidence that the insured, especially children, are able to access hospital services to a larger extent in comparison with the uninsured. This has policy implications, since it informs the government that their move to initiate CHI schemes under the National Rural Health Mission can improve access to care for the poorer sections of society.

However, for CHI schemes to increase access for the poor, certain conditions may need to be met. To begin with, there is a need for effective health care providers who are able to provide quality care. Second, the administration of the scheme needs to be as simple as possible, with a cashless system in place and minimum paperwork for households at all levels. Co-payments and exclusions should be negligible to remove uncertainties at the time of illness. For the scheme to reach out to those living far away, transport costs should be included in the benefit package. And last but not least, the entire scheme should be managed by a credible and trustworthy organization.

Acknowledgements

We would like to thank the more than 100 village volunteers who patiently and with great enthusiasm collected the information, week after week. Without them, this study would not have taken place. We would like to thank Dr Bharat Gadhvi, Mr Easwaran and their team, for travelling the length and breadth of Gudalur, motivating these volunteers and supervising their outputs. And we would like to thank Ms Malathi and Mr Janardhanan for managing the finances and the data, respectively.

This research was co-funded by two donors. The principal investigator, Dr N Devadasan, was supported by a grant from the Institute of Tropical Medicine in Antwerp, Belgium, in the frame of their 5-year agreement (2003–07) with the Belgian Directorate General of Development Cooperation. The field work would not have been possible without the financial support of The Sir Ratan Tata Trust, Mumbai, India. We also acknowledge the administrative support of the Foundation for Research in Health Systems. We would like to thank Messrs American Journal Experts for their copy-editing services. And last, but not least, we would like to thank our reviewers for their excellent advice on improving this article.

Endnotes

[1] RAHA or Raigarh Ambikapur Health Association is a CHI initiated by a faith-based organization. It provides insurance cover for about 70 000 people in three districts of Chattisgarh, an eastern state in India. The population covered is mainly tribal groups, and both ambulatory as well as hospital care is covered for a small annual premium. The scheme is indirectly subsidized by Misereor, a German donor who had commissioned an evaluation of the RAHA scheme in 2006. The information is from this evaluation report.

[2] ACCORD = Community Organisation, Rehabilitation and Development. AMS = Adivasi munnetra sangam. ASHWINI = Association for Health Welfare in the Nilgiris.

References

Andersen R. 1995. Revisiting the behavioral model and access to medical care: does it matter? *Journal of Health and Social Behaviour* **36**: 1–10.

Baeza C, Montenegro F, Nunez M. 2002. *Extending social protection in health through community based organizations: evidence and challenges*. Geneva: International Labour Organization.

Bennett S, Creese A, Monasch R. 1998. *Health insurance for the non-formal sector*. Geneva: World Health Organization.

Criel B. 1998. *Insurance and solidarity: concepts and typology. District based health insurance in sub-Saharan Africa*. 1st edition. Antwerp: Institute of Tropical Medicine.

Criel B, Waelkens MP. 2003. Declining subscriptions to the Maliando Mutual Health Organisation in Guinea-Conakry (West Africa): what is going wrong? *Social Science & Medicine* **57**: 1205–19.

Criel B, Van der Stuyft P, Van Lerberghe W. 1999. The Bwamanda hospital insurance scheme: effective for whom? A study of its impact on hospital utilization patterns. *Social Science & Medicine* **48**: 897–911.

Devadasan N. 2005. Community health insurance in India: a compilation of case studies. Ahmedabad: Friends of Women's World Banking (FWWB).

Devadasan N, Ranson MK, Van Damme W, Criel B. 2004a. Community health insurance in India: an overview. *Economic and Political Weekly* **39**: 3179–83.

Devadasan N, Manoharan S, Menon N *et al.* 2004b. Accord community health insurance – Increasing access to hospital care. *Economic and Political Weekly* **39**: 3189–94.

Devadasan N, Ranson MK, Van Damme W, Acharya A, Criel B. 2006. The landscape of community health insurance in India: An overview based on 10 case studies. *Health Policy* **78**: 224–34.

Dror D. 2005. Field based evidence of enhanced healthcare utilization among persons insured by micro health insurance units in Philippines. *Health Policy* **73**: 263–71.

Ekman B. 2004. Community-based health insurance in low-income countries: a systematic review of the evidence. *Health Policy and Planning* **19**: 249–70.

Gertler P, Gruber J. 2002. Insuring consumption against illness. *The American Economic Review* **92**: 51–70.

Government of Tamil Nadu. 2001. Tamil Nadu Census 2001. Tamil Nadu Government. Online at: http://www.census.tn.nic.in/default.htm, accessed 24 August 2006.

Igun UA. 1979. Stages in health seeking: a descriptive model. *Social Science & Medicine* **13A**: 445–56.

Jütting J. 2003. Do community-based health insurance schemes improve poor people's access to health care? Evidence from rural Senegal. *World Development* **32**: 273–88.

Kutzin J. 1998. Enhancing the insurance function of health systems: a proposed conceptual framework. In: Nitayarumphong S, Mills A (eds). *Achieving Universal Coverage of Health Care*. 1st edition. Bangkok: Ministry of Health: Thailand.

Ministry of Health & Family Welfare. 2002. *National Health Policy 2002*. New Delhi: Government of India.

Ministry of Health & Family Welfare. 2005. *National Rural Health Mission: Mission document*. New Delhi: Government of India.

Ministry of Health & Family Welfare. 2006. *National Health Accounts, India*. New Delhi: Government of India.

Mohindra K, Haddad S, Narayana D, Aravind S. 2005. *Health profile of Kottathara Panchayat*. Montreal: Université de Montréal.

National Sample Survey Organisation. 2006. *Morbidity, health care and condition of the aged*. New Delhi: Government of India.

Peters D, Yazbeck A, Sharma R *et al.* 2002. *Better health systems for India's poor*. Washington, DC: World Bank.

Ranson MK. 2003. Community-based health insurance schemes in India: a review. *National Medical Journal of India* **16**: 79–89.

Ranson MK. 2004. The SEWA medical insurance fund in India. In: Preker AS, Carrin G (eds). *Health financing for poor people: resource mobilization and risk sharing*. 1st edition. Washington, DC: World Bank, pp. 275–92.

Ranson MK, Sinha T, Chatterjee M *et al.* 2006. Making health insurance work for the poor: Learning from the Self-Employed Women's Association's (SEWA) community based health insurance scheme in India. *Social Science & Medicine* **62**: 707–20.

Schneider P, Diop F. 2004. Community based health insurance in Rwanda. In: Preker AS, Carrin G (eds). *Health financing for poor people: resource mobilization and risk sharing*. 1st edition. Washington, DC: World Bank, pp. 251–74.

Sen A. 2002. Health: perception versus observation. *British Medical Journal* **324**: 860–1.

Sinha T, Ranson MK, Chatterjee M, Acharya A, Mills A. 2006. Barriers to accessing benefits in a community-based insurance scheme: lessons learnt from SEWA Insurance, Gujarat. *Health Policy and Planning* **21**: 132–42.

Times of India. 2006. Government to increase expenditure in health sector. 4 August 2006. Online at: http://timesofindia.indiatimes.com/articleshow/1850075.cms

WHO. 2006. *The World Health Report 2006 – Working together for health*. Geneva: World Health Organization.