HEALTH ECONOMICS
Health Econ. **10**: 207–220 (2001)
DOI: 10.1002/hec.589

TARGETED HEALTH INSURANCE IN A LOW INCOME COUNTRY AND ITS IMPACT ON ACCESS AND EQUITY IN ACCESS: EGYPT'S SCHOOL HEALTH INSURANCE

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SUMMARY

Governments are constantly faced with competing demands for public funds, thereby necessitating careful use of scarce resources. In Egypt, the School Health Insurance Programme (SHIP) is a government subsidized health insurance system that targets school children. The primary goals of the SHIP include improving access and equity in access to health care for children while, at the same time, ensuring programme sustainability. Using the Egyptian Household Health Utilization and Expenditure Survey (1995), this paper empirically assesses the extent to which the SHIP achieves its stated goals. Our findings show that the SHIP significantly improved access by increasing visit rates and reducing financial burden of use (out-of-pocket expenditures). With regard to the success of targeting the poor, conditional upon being covered, the SHIP reduced the differentials in visit rates between the highest and lowest income children. However, only the middle-income children benefitted from reduced financial burden (within group equity). Moreover, by targeting the children through school enrollment, the SHIP increased the differentials in the average level of access between school-going children and those not attending school (overall equity). Children not attending school tend to be poor and living in rural areas. Our results also indicate that original calculations may underestimate the SHIP financial outlays, thereby threatening the long run financial sustainability of the programme. Copyright © 2001 John Wiley & Sons, Ltd.

KEY WORDS — access; Egypt; equity; government targeting; school health insurance

INTRODUCTION

In health sector reform, countries across the globe are looking to health insurance as a means of ensuring access to health care and protecting patients from financial risk. One common way to organize the financing of health insurance is through multiple-party contributions, with the government targeting its funds to either *subgroups of the population*, such as the poor, or *specific services* that are most cost-effective and/or thought to preferentially benefit the targeted population, such as primary care [1–4].

In Egypt, the government targets its public funds for health insurance by focusing on a specific population, namely school children, through the School Health Insurance Programme (SHIP). The goals of the SHIP are to improve equity and access to health care, ensure adequate funding, enhance quality, and improve

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Received 1 September 1999
Accepted 3 November 2000
Published online 2 March 2001

cost-efficiency [5]. Although extending health insurance to school populations is not new [6,7], Egypt is probably the first low-income country to do so through school enrolment.

The objectives of this study are to explore and discuss the empirical evidence related to the implementation of the SHIP. While a vast volume of existing literature discusses the incidence [8–14] and equity effects [14–23] of public expenditure on health care, empirical evidence regarding the impact of targeted health insurance on utilization, access and sustainability for a specific population is scarce [24–27]. This paper aims to fill this gap. Specifically, this paper aims to answer three questions. First, has the SHIP improved access to health services? We measure access by utilization of health services and financial cost borne by individuals (out-of-pocket expenditures). Second, is targeting government expenditure on health services through targeting health insurance at a specific population group an effective means to reduce inequity? We examine the extent to which the SHIP has reduced inequity in access to health services for the children enrolled in the SHIP (within group equity) and for the entire school-aged children population (overall equity) separately. We define equity in access as equal access to health services, irrespective of individual financial means (for example, income level). Third, will the programme be financially sustainable, given its original design?

The following section provides a brief description of the SHIP. The third section discusses the empirical method used to answer the study questions. The fourth section describes the data, the Egyptian Household Health Utilization and Expenditure Survey 1995 [28], and variables used. The fifth section presents the results and the sixth section has a discussion and conclusions.

BACKGROUND

Largely, as a result of Egypt's First Lady's concern for children's welfare, Law #99 was passed in 1992 to mandate the expansion of public health insurance to all school children, with the intention of eventually covering all children, regardless of school enrollment status [29]. The SHIP is financed through a combination of sources, including an annual premium of four Egyptian pounds (L.E.) per child from the parents, matched by general government revenues, a cigarette tax earmarked for the SHIP, and co-payments. The health insurance programme provides a comprehensive benefit package, including preventive services, outpatient care, inpatient care, subsidized pharmaceuticals and medical appliances. The SHIP is administered by the Health Insurance Organization (HIO), which is a public organization originally set up to provide health insurance for industrial workers and civil servants in 1964.

The SHIP altered the institutional structure of health care provision, as well as the incentives faced by consumers in a number of ways. We briefly analyse the potential impact of the SHIP on access and equitable distribution of access to health services. We then discuss the potential financial sustainability of the programme, given its original design.

Access and equity in access: utilization and financial burden

Prior to the introduction of the SHIP, publicly provided health services for school children were provided by the School Health Department of the Ministry of Health (MOH), at almost no charge to the patient. In reality, access to health care was limited as a result of two reasons. First, there was an under-supply of public health facilities in rural areas. Both distance and poor transportation prevented easy access to health facilities. Second, the quality of services at public health facilities was relatively poor owing to budget constraints and low staff motivation [30]. Despite the fact that public services were being provided almost free of charge, they were not the preferred option. Private health care services, however, were relatively expensive and cost-prohibitive for lower income households. For example, the average price for private outpatient care from our survey was close to L.E. 20, whereas the median household income in the lowest income quintile was less than L.E. 200 for an average household size of four to five people. Both of these factors hampered the ability of the poor (especially rural) children to access health care.

To improve access, the SHIP added to the HIO providers an extensive network of private physicians through contracting. Similarly, access to inpatient services was ensured through a network of public and private hospitals. Beneficiaries were allowed free choice of providers. Irrespective of provider types visited, there was no charge at the point of service. Simultaneously, awareness of the explicit obligations of the HIO to provide services was publicized, thus making public providers more attractive to the users.

To the extent that the poor and the rural residents experienced the greatest barrier to access, the SHIP is expected to benefit them most. The SHIP is thus predicted to reduce the differences in health care utilization among children from families with different financial means. We argue that this is welfare enhancing. Although existing literature on the causal relationship between health care utilization and health outcomes is mixed, there is emerging evidence to indicate that increased utilization could improve health status among low income children [31–35]. This should be especially the case in Egypt, as health care utilization differs by two to six folds across income quintiles, conditional upon same health status (self-perceived) [28].

The improvement in equitable access, however, only pertains to the population that is covered by the SHIP (within group equity). As the SHIP is administered through school enrolment, it excludes children from low income families who do not attend school. Thus, the SHIP can potentially exacerbate inequity for the entire school-age-children population (overall equity).

Financial sustainability

A key concern of any public insurance programme is the extent to which the programme is financially sustainable. In the absence of any detailed demand and cost studies, the HIO estimated that each enrolled child would cost L.E. 35 per year. Furthermore, between 1993 and 1997, the number of visits per beneficiary would remain constant, at 2.05 visits prevailing at the time. On the basis of these assumptions and expected enrollee expansion, the HIO projected total expenditure of the SHIP. If the SHIP were to increase utilization, the original financial projections would lead to an underestimation of required resources to finance the programme in the longer term, and thus, threaten its financial sustainability.

METHOD

Access

Access in terms of utilization is measured by the likelihood of visiting a health care provider. In terms of financial burden, access is measured by out-of-pocket expenditures borne by individuals. To empirically assess the impact of the SHIP on health care utilization behaviour of school aged children, we used the two-part model developed as part of the Rand Health Insurance Experiment [36–39]. Part one is a logit model estimating the individual child's probability of visiting a formal care provider. We include MOH, HIO and private (with or without HIO contract) providers as formal care providers, rather than just focusing on HIO and HIO contract providers, for two reasons. First, our goal is to examine the impact of SHIP on access to health care services overall, but not just to specific providers. If the SHIP leads individuals to substitute care across types of providers, counting only visits to HIO providers will lead to misinterpretation of the results on overall access. Second, our data do not allow us to identify whether providers are under HIO contract. Formally, part one of the model can be written as follows:

$$\text{Prob}(\text{visit} > 0) = X\beta + \varepsilon \quad (1)$$

Part two is a log-linear model that estimates the incurred level of out-of-pocket expenditures, conditioning on positive use of health care services. It can be written as:

$$\text{Log}(\text{out-of-pocket expenditure} \mid \text{visit} > 0) = X\gamma + \mu \quad (2)$$

where X represents a set of independent variables that are hypothesized to affect individual patterns of utilization, including SHIP enrolment status. β and γ are vectors of coefficient estimates of the respective models. ε and μ are error terms.

Standard errors are robust standard errors corrected for intra-household correlations among individual observations.

Financial sustainability

To assess the financial sustainability of the SHIP, we simulated the *per capita* programme expenditures under different scenarios of the SHIP coverage. Given administrative records, the HIO would, most likely, predict the number of SHIP enrollees correctly. Therefore, any over/under-estimation of total expenditure would stem from over/under-estimation of per capita expenditure. Per capita expenditure is predicted using Equations (3) and (3.1)

$$\text{Expenditure per capita} = (\text{Number of visits per capita}) * (\text{Expenditure per visit}) \quad (3)$$

where,

$$\text{Number of visits per capita} = (\text{Probability of visit}) * (\text{Number of visits}|\text{visit} > 0) \quad (3.1)$$

We briefly describe how each component of Equations (3) and (3.1) is estimated. The probability of visits is predicted, as in Equation (1). To estimate the number of visits conditional on positive use, we explored several statistical models, including the log-linear model, the Poisson model and the negative binomial model. However, given that our survey data (see the 'Data and Variables' section) has a 2-week recall, there is limited variation in the number of visits. Close to 82% of the sample had only one visit, and another 14% had two visits. This limited variation does not allow us to detect variation of *conditional visits* by insurance status. Besides, the Poisson and the negative binomial models were relatively sensitive to specifications. For predicting financial outlay purposes, we have, therefore, chosen to use the sample average number of visits. As a result, variation in the number of *unconditional* visits is largely driven by variation in the probability of visit. Strictly speaking, only visits to SHIP networks/contract providers matter for predicting programme expenditure. However, our data do not differentiate provider types clearly. Consequently, our estimates of visits can under-estimate the magnitude of 'increase' in visits to SHIP providers if beneficiaries shifted from previously-paid private practice to those under SHIP contract as a result of the SHIP. In 1995, HIO reported that 64% of its physicians are private practices under contract.

We approximated expenditure per visit by using out-of-pocket expenditures at private providers as reported by non-SHIP covered children (L.E. 19). This is because our household survey data [28] only reports patients' out-of-pocket expenditure, but not the actual expenditure of the programme. This method assumes that private prices reflect the full cost of services, which may over-estimate programme costs if the private price incorporates profits earned by private providers, but may under-estimate costs if the cost of services have increased as a result of increased intensity of services and improved quality under the SHIP. Our analysis of the financial sustainability of the SHIP is, therefore, necessarily partial. Nonetheless, it provides a more systematic approach to predict programme expenditures under the expansion of health insurance.

DATA AND VARIABLES

The data for this study is the Egypt Household Health Care Utilization and Expenditure Survey [28], conducted in the winter of 1994 and summer of 1995. The sample consists of 10664 households and 53824 individuals, of which 93.13% and 94.72% were successfully interviewed, respectively. The sample was designed to provide estimates of all major variables at the national and regional level (Egypt is divided into five administrative regions), and was based on the same sampling frame as the Egypt Demographic and Health Survey, 1992 [40] covering 21 governorates (administrative geographic units) of Egypt.

Data collected from the survey include standard socio-demographic information, insurance coverage, perception of health status, employment, utilization and out-of-pocket expenditures of health services, and perception of quality of health care services used. A 2-week and a 1-year recall period was used for outpatient and inpatient care, respectively. Our analysis restricted the sample to those between the age of 6 and 18, which represents the ultimate target population for the SHIP. Owing to the limited sample size for inpatient utilization, only outpatient utilization of health services was examined in this study.

We have chosen to use the entire sample for analysis over the sample that reported illness in the last 2 weeks because of the possible endogeneity of illness and health care use. That is, if there are unobservable factors that are correlated with both the likelihood to report illness and to seek care, estimates from the 'ill' sample will be biased upward. To test for the robustness of the results, we conducted the same analysis on the 'ill' sample and found no significant differences.

The following variables were included in the analysis:

- ***SHIP coverage***. Based on responses to the age and insurance questions, we identified individuals between age 6 and 18 who were covered by the SHIP, and indicated them with a dummy variable. Insurance information was collected at the household, and not at the individual level. If a household had several children and responded that it was covered by SHIP, the questionnaire did not permit us to identify which child was covered (about 8% of the households had multiple eligibles). In such cases, we assigned all individuals within the household who were between 6 and 18 years old, and currently attending school, as being covered by SHIP. As a result, the variable SHIP is measured with error, and will tend to bias the coefficient towards zero. If any significant results of SHIP are found, the estimates could be interpreted to represent a lower bound of the impact of SHIP. An alternative approach is to use instrumental variables, but our data do not provide any valid instruments.
- ***Other insurance***. In our sample, a relatively small proportion (3%) of children between 6 and 18 years old were also covered by health insurance other than the SHIP, such as private insurance or employer provided insurance through parents. We identified this group separately from those covered only by the SHIP, and controlled for it in the estimation.
- ***In school/without SHIP***. Theoretically, Law 99 calls for the coverage of all school children in Egypt by the SHIP. However, at the time of the survey, the programme was still being phased in, and had not been extended to all those eligible. This allowed us to separate the SHIP and the schooling effects (that is, attending school alone may have an effect on health care utilization independent of SHIP coverage). We included a dummy variable to indicate children who were currently attending school, but were not covered by the SHIP. These children tend to reside in the rural areas, and are from families with lower levels of income and parental education (Appendix A).
- ***Income and income/SHIP interactions***. Independent of insurance, income is hypothesized to have a positive effect on health care utilization. Income is measured as *per capita* income in order to control for the effect of household size. To analyse the extent to which the SHIP reduces the inequity in access to health services across income groups, we included interactive variables between income and SHIP. The interaction variables allowed us to test whether income differentiates the impact of the SHIP on the health-seeking behaviour of children *covered by SHIP*. On the one hand, if barriers to access in the pre-SHIP era were inversely related to the level of income, expanding health insurance through the SHIP would have a bigger impact on lower income groups and, therefore, reduce the inequity of access owing to income differences. On the other hand, higher income individuals might be better able to take advantage of the SHIP through better understanding of the value of the programme, access to information, better education etc. In this case, the SHIP can be regressive.
- ***Other demand side factors***. A set of demand side factors including parental education, age, gender, and perceived health status were controlled for. We also controlled for seasonal differences, since the Egyptian Household Health Utilization and Expenditure Survey was conducted in two seasons, winter and summer.
- ***Supply side factors***. Supply side factors are significant determinants of access to health services. At the time of the survey, HIO had not assured supply for all the SHIP beneficiaries through contracting of private providers. However, our household survey data cannot identify which areas do not have adequate supply of SHIP providers. In order to isolate the potential supply effect on health care utilization, we included dummy variables for urban/rural areas and for each governorate, and interaction variables between the urban/rural and individual governorate dummy variables. This set of dummy variables also served to control for any unobservable regional differences that can potentially be correlated with the key variables of interest.

RESULTS

Descriptive sample characteristics

Table 1 indicates that, by the summer of 1995, about 61% of children between 6 and 18 years of age, or 82% of all children currently enrolled in school had been covered by the SHIP. This approximates closely to the HIO data which show that 71% of all school-age children were covered by the SHIP in March/April of 1996. Probably, as a result of the higher likelihood of attending schools, higher proportions of children are covered in urban areas and among higher income households. Appendix A shows the sample characteristics of children who are covered by the SHIP (**SHIP**), who are currently attending school, but are not covered by the SHIP (**in school/without SHIP**), and who are currently not attending school (**not in school**).

Table 2 presents the mean visit rates and out-of-pocket expenditure per visit. The difference between the 'in school/without SHIP' and the 'not in school' samples represents the schooling effect, while the difference between the 'SHIP' and the 'in school/without SHIP' samples represents the SHIP effect. At the national level, the 'SHIP' sample is twice as likely (0.08 versus 0.04), and 33% as likely (0.08 versus 0.06), to visit a provider than the 'not in school' and the 'in school/without SHIP' children, respectively. Schooling alone accounts for 50% of the increase in visit rates (0.06 versus 0.04), but unlike the SHIP, schooling plays no role in reducing the financial burden on school children.

Comparing the urban/rural and regional samples, the SHIP effect dominates in the urban areas, while the schooling effect dominates in the rural area in terms of visit rates. Being in school and not covered by the SHIP increases out of pocket expenditure for the rural population, however, the SHIP coverage reduces out of pocket expenditure.

Across income groups, although gaps in visit rates between the highest and lowest income quintiles still exist with SHIP, the gaps are narrower for those with SHIP coverage. On the other hand, only the middle-income children experienced a significant reduction in financial burden as a result of the SHIP.

Model estimates

Access and equity in access. Models 1A and 1B in Table 3 present the results of the probability models. To facilitate interpretation, coefficient estimates were translated into odds ratios. In Model 1A, the SHIP coefficient represents the average effect of SHIP across different income groups. The 'in school/without SHIP' coefficient measures

Table 1. School health insurance coverage and school attendance

	SHIP (%)	In school/without SHIP (%)	Not in school (%)
National ($n = 17\,170$)	60.5	13.9	25.6
Urban ($n = 7138$)	72.7	10.2	17.1
Rural ($n = 10\,032$)	51.9	16.5	31.6
Region			
Urban governate ($n = 3325$)	75.1	7.7	17.2
Urban upper Egypt ($n = 1828$)	72.7	13.0	14.3
Rural upper Egypt ($n = 5481$)	60.5	14.0	25.5
Urban lower Egypt ($n = 1984$)	68.7	11.8	19.5
Rural lower Egypt ($n = 4552$)	41.5	19.5	39.0
Income quintiles			
Quintile 1: (<560 L.E.) ($n = 3406$)	43.8	15.0	41.2
Quintile 2: (560–804 L.E.) ($n = 3447$)	54.4	14.3	31.3
Quintile 3: (804–1103 L.E.) ($n = 3438$)	63.2	15.2	21.6
Quintile 4: (1104–1704 L.E.) ($n = 3435$)	68.7	12.1	19.2
Quintile 5: (> 1704 L.E.) ($n = 3444$)	72.4	13.0	14.6

Income quintile is based on per capita annual income (household income divided by household size).

Table 2. Utilization pattern by SHIP coverage and school attendance status

	SHIP ($n = 10\,473$)		In school/without SHIP ($n = 2403$)		Not in school ($n = 4654$)	
	Rates	Exp	Rates	Exp	Rates	Exp
National	0.08***	14.57***	0.06***	22.11	0.04	18.52
Urban	0.10***	15.50	0.07	20.37	0.07	22.07
Rural	0.06	13.00***	0.06***	23.00**	0.03	15.31
Region						
Urban governate	0.11*	16.96	0.07	23.37	0.09	27.35
Urban upper Egypt	0.10	16.17	0.07	16.19	0.07	12.84
Rural upper Egypt	0.05	12.98***	0.06***	26.02	0.03	20.30
Urban lower Egypt	0.07	10.63**	0.06	21.07	0.06	18.58
Rural lower Egypt	0.07	12.98**	0.05***	19.90**	0.03	11.68
Income quintiles						
Quintile 1: (< 560 L.E.)	0.07**	8.18	0.04	8.95	0.03	13.95
Quintile 2: (560–804 L.E.)	0.06	8.19***	0.07***	17.80	0.04	15.23
Quintile 3: (804–1103 L.E.)	0.07	12.23***	0.05	24.48	0.06	19.71
Quintile 4: (1104–1704 L.E.)	0.09	11.44***	0.07	31.59	0.05	22.80
Quintile 5: (> 1704 L.E.)	0.10	24.14	0.08	24.24	0.07	22.39

Rates = Share of children with visit(s) in the last two weeks. Exp = Per visit out-of-pocket expenditure conditional on positive visit, in L.E. US $1 is approximately equal to 3.3 L.E.
Z-tests were performed to compare the rates of the 'SHIP' with the 'in school/without SHIP' sample, and the 'in school/without SHIP' sample with the 'not in school' sample. Similarly, t-tests were performed for expenditures.
* 10% significance level; ** 5% significance level; *** 1% significance level.

the schooling effect and the difference between the 'SHIP' and the 'in school/without SHIP' coefficients measures the increase in access owing to SHIP. On average, 'SHIP' children are 34% more likely to visit a provider as compared to the 'not in school' children, and 9% (1.34/1.223) more likely than the 'in school/without SHIP' sample. The results imply that schooling alone accounts for 65% (0.223/0.340) of the higher utilization of SHIP enrollees.

Model 1B differentiates the SHIP effect by income groups by including SHIP/Income interaction variables. We first included interactions for each income quintile. We tested for equality among them, and concluded that the second through fourth income quintiles could be aggregated. Compared with the children without SHIP, the SHIP increased the probability of visit by 97% for the lowest income children, 25% for the middle-income children, and had minimal effect on the highest income children. These results show that the SHIP benefits the poor most and therefore helps to reduce the inequity in access among school children covered by SHIP. Results of other variables are consistent with expectations, with the higher-income, younger and poorer health children more likely to visit the provider.

Results from Models 2A and 2B show that the SHIP significantly reduced the out-of-pocket expenditures borne by the SHIP beneficiaries. However, this impact is only significant for the middle-income sample.

Log-likelihood ratio tests were performed for the logit regressions testing the joint significance of the income/SHIP interactions and the urban/rural and governorate dummy variables (column 1B). Analogous F-tests were also performed for the log linear models (column 2B). The results confirmed that the income/SHIP interactions are jointly significant at the 95% significance level for both the logit and the expenditure equations. On the other hand, urban/rural and governorate dummy variables are only jointly significant in explaining the likelihood of visits, but not out-of-pocket expenditures.

To tease out the 'pure' SHIP effect and school attendance effect on utilization and health expenditures, and to show the magnitude of the effects implied by the coefficients, we used the recycling prediction method [41]. We predicted the

Table 3. Regression results for Equations (1) and (2)

	Probability of visit: logit model ($n = 17\,170$)		Conditional expenditure: log linear model ($n = 1129$)	
	Model 1A	Model 1B	Model 2A	Model 2B
SHIP[a]	1.340*** (0.129)		−0.359*** (0.101)	
SHIP ∗ Inc 1		1.966*** (0.371)		−0.090 (0.209)
SHIP ∗ Inc 2–4		1.249* (0.142)		−0.488** (0.212)
SHIP ∗ Inc 5		1.108 (0.186)		0.131 (0.251)
In school/without SHIP[a]	1.223* (0.143)	1.185 (0.142)	0.147 (0.129)	0.167 (0.127)
Insured	0.948 (0.180)	0.914 (0.175)	−0.266 (0.234)	0.225 (0.225)
Income 2	1.186 (0.155)	1.538** (0.288)	0.033 (0.130)	0.335* (0.197)
Income 3	1.260* (0.162)	1.643*** (0.307)	0.370*** (0.118)	0.694*** (0.192)
Income 4	1.413*** (0.174)	1.844*** (0.347)	0.290** (0.117)	0.638*** (0.196)
Income 5	1.494*** (0.203)	2.139*** (0.434)	0.608*** (0.140)	0.487** (0.225)
Parental education: primary	1.144 (0.118)	1.142 (0.117)	−0.068 (0.103)	−0.069 (0.103)
Parental education: secondary	1.442*** (0.143)	1.447*** (0.143)	0.128 (0.102)	0.129 (0.100)
Parental education post-secondary	1.257 (0.190)	1.276 (0.192)	0.371*** (0.135)	0.351*** (0.136)
Season	0.453*** (0.037)	0.453*** (0.037)	0.392*** (0.078)	0.384*** (0.077)
Health very good	1.511 (0.429)	1.514*** (0.429)	−0.302 (0.420)	−0.315 (0.418)
Health good	2.506*** (0.699)	2.512*** (0.699)	−0.204 (0.420)	−0.202 (0.418)
Health fair	6.403*** (1.765)	6.394*** (1.759)	−0.095 (0.422)	−0.104 (0.421)
Health poor	8.775*** (2.491)	8.798*** (2.492)	−0.021 (0.430)	−0.033 (0.428)
Age 12–15	0.791*** (0.068)	0.792*** (0.068)	0.096 (0.092)	0.092 (0.091)
Age 15–18	1.018 (0.089)	1.009 (0.089)	0.035 (0.099)	0.039 (0.099)
Female	0.972 (0.064)	0.971 (0.064)	−0.084 (0.063)	−0.082 (0.063)
Urban	1.640** (0.399)	2.178 (1.154)	0.458 (0.492)	0.531 (0.490)
Governorate dummies	Yes	Yes	Yes	Yes
Urban* governorates	Yes	Yes	Yes	Yes
Pseudo $\bar{R}^2$	0.100	0.101	0.177	0.188
LR test/F-test: area dummies and interactions		$\text{Chi}^2 = 115.23$ probability > $\text{Chi}^2 = 0.000$		F(16 385) = 2.04 probability > $F = 0.0101$
LR test/F-test: SHIP/income interactions		Chi^2 (2) = 7.15 probability > $\text{Chi}^2 = 0.028$		F(2385) = 6.48 probability > $F = 0.0017$

[a] The omitted category are those not currently enrolled in school—the 'not in school' children.
* 10% significance level; ** 5% significance level; *** 1% significance level.

probabilities of visit and out-of-pocket expenditures by changing only insurance status and school attendance, while retaining all other characteristics of the sample. For example, to predict the probability of visit under SHIP, we assumed that everybody in the sample had SHIP. Similarly, to predict the probability of visit under the 'in school/without SHIP' status, we assumed that each child in the sample was attending school, but did not have SHIP, and likewise for the 'not in school' status. The differences in the probabilities predicted under the three scenarios, therefore, are exclusively owing to the effect of SHIP coverage/school attendance status, as under all three predictions this was the only variable that changed value.

The upper panel of Table 4 shows the predicted probability of visit under the different SHIP coverage/school attendance status for each income quintile. For children in the lowest income quintile, school enrolment alone (from 'not in school' to 'in school/without SHIP' status) increases the probability of visit from 2.85% to 3.95%. The change from 'in school/without SHIP' to 'SHIP' status further increases the visit rate to 6.52%. The same pattern is observed in the other income groups, but to a lesser extent. This differential effect on access across income groups reduces the gap in visit rate between the highest and lowest income individuals covered by SHIP (0.065 and 0.097 versus 0.040 and 0.086). On the other hand, school attendance without SHIP enrolment exacerbates the gap (0.040 and 0.086 versus 0.029 and 0.068). The lower panel of Table 4 shows that SHIP reduces the out-of-pocket expenditure for the middle-income group almost by half, whereas the reduction for the lowest and highest income beneficiaries is minimal.

Targeting government expenditures through targeting a specific population. What impact does the SHIP have on the distribution of access for the entire children population between 6 and 18 years old? In Egypt, a sizeable number of school-age children do not attend school and, therefore, do not benefit from SHIP, as the SHIP is administered through school enrolment. These non-attending children come disproportionately more from disadvantaged groups—the poor, female, and rural children. We estimated the probability of school enrolment for the sample of children between 6 and 18 years old, and found that socio-economic and demographic factors, such as income, parents' education and gender, are the major determining factors in children's school attendance. In particular, children in the higher three income quintiles are twice as likely to go to school than those in the lowest income quintile. Parents with at least high school level education are 3.5 times as likely to enrol their children in school than those without any education, and parents with at least college level training are six times as likely to send their children to school as their illiterate counterparts. As a result, while the SHIP can potentially reduce differentials in access

Table 4. Predicted probability of visit and out-of-pocket expenditures by SHIP coverage/school attendance status, by income group

	SHIP	In school/without SHIP	Not in school	Overall
Predicted probability of visit				
Quintile 1	0.0652	0.0395	0.0285	0.0464
Quintile 2	0.0610	0.0569	0.0421	0.0545
Quintile 3	0.0693	0.0584	0.0497	0.0634
Quintile 4	0.0843	0.0704	0.0569	0.0774
Quintile 5	0.0968	0.0858	0.0675	0.0912
Overall	0.0772	0.0612	0.0442	0.0666
Predicted out-of-pocket expenditures conditional on positive visit (L.E.)				
Quintile 1	10.40	11.92	10.67	10.65
Quintile 2	9.75	19.52	17.91	13.39
Quintile 3	13.96	28.45	27.21	18.31
Quintile 4	13.19	25.87	24.66	15.95
Quintile 5	24.80	26.54	21.65	24.67
Overall	16.01	23.20	20.22	17.64

for its beneficiaries (relative equity gain within a group), it is likely to increase the overall gap in access for the entire children population (worsening in overall equity).

Simulated programme expansions. As described in the 'Background' section, the original premium calculation of the SHIP was based on the assumption that health care utilization would remain constant under the expansion of the SHIP. Consequently, if utilization rates, or intensity and quality of services increased as a result of the introduction of the SHIP, the financial sustainability of the programme can be threatened.

Using the results of our estimations, we simulated the utilization rates and expenditures of outpatient visits under three scenarios. Scenario 1 assumes that there is no SHIP for all children as a base scenario. Scenario 2 illustrates the situation when the SHIP is completely phased in to cover all school children, and Scenario 3 represents the case when the SHIP is expanded to the entire population between 6 and 18 years old. As explained earlier, our financial sustainability assessment of the SHIP is necessarily partial due to data limitations, and the estimates are not intended to be precise measurements of programme outlay.

Table 5 presents the simulated results. In the absence of SHIP (Scenario 1), the predicted probability of visit for children between 6 and 18 years old is 0.0641 (weighted average of visit rates of the three samples). This translates into 2.1 visits per year, approximating closely to the 2.05 annual visits used in the original assumption of expenditure calculation used by the HIO. The respective visit rates for the 'SHIP', the 'in school/without SHIP', and the 'not in school' samples are 0.0731, 0.0612 and 0.0442. When the SHIP is expanded to cover all school-attending children (Scenario 2), visit rates for the 'SHIP' sample increased by 5.6% to 0.0772 and visit rates for the 'in school/without SHIP' sample increased by 9.6% to 0.0671. The difference in visit rate increase as a result of the SHIP expansion for the two samples is owing to differences in sample characteristics. For policy simulation purposes, it makes sense to predict at the sample characteristics. If we use the 'SHIP' sample visit rates to predict utilization of the other samples, we will over-estimate the SHIP effect. The weighted-average visit rate for the covered sample under Scenario 2 is 0.0753, which represents a 17% increase from 0.0641, the

Table 5. Simulated visit rates and expenditures *per capita*

Predicted probability of outpatient visit	SHIP	In school/ without SHIP	Not in school	SHIP covered sample@ under different scenarios
Sample mean	0.0772	0.0612	0.0442	0.0772
Scenario 1: assume no SHIP (weighted average of the entire 6–18 year old sample is 0.0641) (weighted average of the 'SHIP' and 'in school/without SHIP' sample is 0.071)	0.0731	0.0612	0.0442	N.A.
Scenario 2: assume SHIP expanded to all children enrolled in school	0.0772	0.0671	0.0442	0.0753
Scenario 3: assume SHIP expanded to all children between 6 and 18	0.0772	0.0671	0.0590	0.0712
Predicted annual outpatient expenditure *per capita* (L.E.)				
Sample mean	50.35	39.90	28.82	50.35
Scenario 1: assume no SHIP (weighted average of the entire sample is L.E. 41.8) (Weighted avergae of the 'SHIP' and 'in school/without SHIP' sample is L.E. 46.2)	47.67	39.90	28.82	N.A.
Scenario 2: assume SHIP expanded to all children enrolled in school	50.35	43.76	28.82	49.10
Scenario 3: assume SHIP expanded to all children aged 6–18	50.35	43.76	38.47	46.36

N.A. = Not applicable. @: note that the definition of the SHIP covered sample varies with the scenario.

average visit rate when there is no SHIP coverage for all. This implies an increase of annual outpatient expenditure from L.E. 41.8 (when there is no SHIP, for the entire 6–18 year old children sample) to L.E. 49.1 per enrollee. If we exclude the 'not in school' sample in the base case of no SHIP coverage, then the expansion of SHIP for the school-attending children leads to a 6% increase in visit rate (or annual expenditure) from 0.071 (or L.E. 46.2) to 0.0753 (or L.E. 49.1).

When the SHIP is expanded to *all* children between 6 and 18 years old (Scenario 3), the average visit rate for this population increased by 11% from 0.0641 to 0.0712, with the visit rate for the 'not in school' sample increased by 33.5% from 0.0442 to 0.059. It is worthwhile to note that, by including the 'not in school' children in the SHIP, the average per enrollee use rate (and hence, expenditure) for the entire SHIP covered sample is reduced compared with Scenario 2. This is because, despite a large increase of visit rates owing to the SHIP coverage, the 'not in school' visit rate is still lower than the 'SHIP', and the 'in school/without SHIP' visit rates. This implies that, if the same flat premium (L.E. 4 per annum per child) is levied on the 'not in school' sample, as the SHIP is expanded to them, (which tend to be the lower income households in rural areas), this financially less well off population may be cross-subsidizing the higher-income households.

The above results show that, depending on the eventual target population (school-going children or all children between 6 and 18 years old), the SHIP could potentially experience a financial shortfall of 11–17% per beneficiary. This could threaten the financial sustainability of the programme, and/or lead to changes in other variables. For example, the SHIP may increase the premium level, change the benefit package by increasing co-insurance rates and reducing the scope of services covered, and/or restrict the supply of services by rationing. All of these could counter the intended objectives of increasing access and reducing financial burden.

DISCUSSION AND CONCLUSION

The primary objectives of expanding health insurance coverage to school children in Egypt were to improve access to health services and to reduce inequitable access to health services for children. The advantage of targeting public health care expenditures through school enrolment is the easy definition and administration of the target group. The disadvantage of this targeting method, however, is that school enrolment is often skewed towards higher income and/or urban population groups. In this paper, we provide an empirical assessment of the extent to which the SHIP succeeded in improving access and in reducing the inequitable access to health services.

Our main finding confirmed that the SHIP has significantly improved access for those enrolled under the programme by increasing the probability of visit and reducing the financial burden of use. At the time of the study, approximately 20% of the surveyed children reported health problems during the observation period, and yet, did not seek health care, and the predominant reason for not seeking care was related to the cost of health services, suggesting that financial barriers to access still existed. However, the proportion of those who did not seek health services owing to its cost was lower among the SHIP beneficiaries than among the others (both in school and not in school). This suggests that, despite the SHIP, the financial barrier to access to care has not entirely alleviated, but it has helped to reduce its extent.

With regard to the success of targeting the poor by the SHIP, the results are mixed. Among children covered by the SHIP, while the lowest income children benefit the most in terms of probability of visit, the middle-income groups enjoy the greatest reduction in financial burden. Why were there no detectable differences in out-of-pocket expenditures borne by the poorest children as a result of SHIP coverage? Why were the parents willing to pay 4 L.E. per year for no measurable benefits in reduced financial expenditure? This may suggest that the poor value securing access (visit) so much that they have a high willingness to pay for it. It may also suggest that the poor are being taken advantage of and they are, in fact, cross-subsidizing the middle-income groups, or it may be because the poor are indeed 'buying' quantitatively more and better health services, while maintaining approximately the same level of out-of-pocket expenditure. A full analysis of these issues requires much more detailed data, and is beyond the scope of this paper. Nonetheless, the findings raise serious concerns about the effectiveness of the SHIP in targeting the poor, and warrants further careful analysis in the future.

Considering the entire child population (both in and out of school), the expansion of the SHIP does nothing to affect access of the *school-age* children who do not attend school. In fact, the SHIP increases the differentials in the average level of access between school-going children and those not attending school. We found that school enrolment is clearly biased towards male children in higher socio-economic groups residing in urban areas.

Are the non-school attending children made worse off by the program? Not necessarily, unless there are government subsidies going to benefit SHIP beneficiaries which otherwise would have gone to benefit non-school attending children and their situation actually worsens as a result of the programme. We are unable to answer this question with the available data. But it does highlight some of the problems with targeted insurance programs generally, when these are designed to benefit relatively better off segments of society. There may be perfectly good reasons for targeting benefits in this way, as in the case of SHIP, it would be very difficult to reach non-school going children. (In the same way, it is difficult to reach households outside of the formal employment sector with wage-based health insurance). But targeted benefits, while helping one group, may worsen overall distribution in society. For low income countries, where school enrolment is not universal, targeting government funded health insurance through school enrolment can potentially reduce the equitable distribution of health services than a more universal programme would.

Our results also showed that the original financial calculations of HIO may underestimate the financial outlays under SHIP, as they did not take into account utilization increases as a result of the SHIP. This threatens the financial sustainability of the programme, and may jeopardize both future plans to expand coverage and effective health care provision for those already covered. The methodology adopted in this paper for predicting expenditures under different policy scenarios may also be used by policy makers as a useful tool to assess financial sustainability for social insurance programmes.

Owing to limited information, our analysis cannot provide a complete assessment of the welfare implication of the SHIP. In particular, we were not able to assess the impact on health as a result of the SHIP. Nonetheless, our analysis provides a first step towards such an assessment. Future work should build upon this analysis by providing an analytical evaluation on the impact of such social insurance programmes on health and the equity of health of the population.

ACKNOWLEDGEMENTS

This analysis is supported by the Data for Decision Making Project at the Harvard School of Public Health and funded by the United States Agency for International Development (USAID), co-operative agreement no. DPE-5991-A-00-1052-00. We wish to thank Michael Reich for his comments on an earlier draft. We are grateful for the able assistance of Isadora Gil, Melitta Jakab and Karen Neoh.

APPENDIX A: SAMPLE CHARACTERISTICS

	SHIP	In school/ without SHIP	Not in school
Age (6–12)	62.9%	64.2%	41.4%
Age (12–15)	23.0	20.5	27.3
Age (15–18)	14.1	15.3	31.4
Parents' education			
Illiterate	54.4%	69.6%	82.5%
Primary	16.0	12.0	11.0
Secondary	21.6	14.1	5.5
Post-secondary	8.1	4.4	1.0
Health status			
Poor	3.6%	6.0%	5.1%
Fair	22.8	24.3	24.8
Good	57.1	54.7	55.7
Very good	12.3	10.7	9.7
Excellent	4.3	4.3	4.7
Male	53.9%	58.2%	41.2%
Female	46.1	41.8	58.8
Income			
Quintile 1	14.5%	21.5%	32.2%
Quintile 2	18.0	20.6	24.5
Quintile 3	20.9	21.8	16.9
Quintile 4	22.7	17.4	15.0
Quintile 5	23.9	18.7	11.4
Urban	49.9%	30.6%	27.8%
Rural	50.1	69.4	72.3

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