

# Costs, equity, efficiency and feasibility of identifying the poor in Ghana's National Health Insurance Scheme: empirical analysis of various strategies

Genevieve Cecilia Aryeetey<sup>1,2</sup>, Caroline Jehu-Appiah<sup>1,3</sup>, Ernst Spaan<sup>1</sup>, Irene Agyepong<sup>4</sup> and Rob Baltussen<sup>1</sup>

<sup>1</sup> Department of Primary and Community Care, Radboud University Nijmegen Medical Center, Nijmegen, The Netherlands

<sup>2</sup> School of Public Health, University of Ghana, Accra, Ghana

<sup>3</sup> Ghana Health Services, Accra, Ghana

<sup>4</sup> Greater Accra Regional Health Directorate, Ghana Health Service, Accra, Ghana

## Summary

**OBJECTIVES** To analyse the costs and evaluate the equity, efficiency and feasibility of four strategies to identify poor households for premium exemptions in Ghana's National Health Insurance Scheme (NHIS): means testing (MT), proxy means testing (PMT), participatory wealth ranking (PWR) and geographic targeting (GT) in urban, rural and semi-urban settings in Ghana.

**METHODS** We conducted the study in 145–147 households per setting with MT as our gold standard strategy. We estimated total costs that included costs of household surveys and cost of premiums paid to the poor, efficiency (cost per poor person identified), equity (number of true poor excluded) and the administrative feasibility of implementation.

**RESULTS** The cost of exempting one poor individual ranged from US\$15.87 to US\$95.44; exclusion of the poor ranged between 0% and 73%. MT was most efficient and equitable in rural and urban settings with low-poverty incidence; GT was efficient and equitable in the semi-urban setting with high-poverty incidence. PMT and PWR were less equitable and inefficient although feasible in some settings.

**CONCLUSION** We recommend MT as optimal strategy in low-poverty urban and rural settings and GT as optimal strategy in high-poverty semi-urban setting. The study is relevant to other social and developmental programmes that require identification and exemptions of the poor in low-income countries.

**keywords** costs, equity, efficiency, feasibility, health insurance, Ghana

## Introduction

In 2004, Ghana introduced the National Health Insurance Scheme (NHIS) as part of the nation's policy objective to minimize out of pocket health expenditure at point of service and to ensure equitable access to health care, particularly for the poor. The NHIS by law exempts certain categories of the population (younger than 18 years and older than 69 years). The policy also stipulates premium exemptions for the core poor (indigents) between the ages of 18 and 69 (Ghana 2003, 2004). Identifying and exempting the indigent have remained a challenge with respect to the strategy to adopt (Stierle *et al.* 1999; Coady *et al.* 2003), and the strategy that accurately identifies all poor individuals (maximizing equity) at the lowest cost (maximizing efficiency) is preferable.

We considered four strategies to identify the poor, based on a recent review (Jehu-Appiah *et al.* 2010), and evalu-

ated these strategies in terms of their equity and efficiency. First, means testing (MT), which identifies poor households or individuals on the basis of an income or expenditure threshold, was recognized as the gold standard strategy for this study as it accurately identifies income poverty and the study is concerned with ability to pay a premium. MT is costly and administratively complex as it requires collection of detailed household consumption expenditure (Grosh 1992; Deaton 1997; Coady & Parker 2005; Lindert 2005). Second, proxy means testing (PMT) identifies the poor based on the indicators that correlate with household socio-economic status (SES) such as education, housing characteristics and ownership of durable assets (Montgomery *et al.* 2000; Filmer & Pritchett 2001; Ahmed & Bouis 2002; Sahn & Stifel 2003; Johannsen 2006; Vyas & Kumaranayake 2006; Booysen *et al.* 2008). Third, in participatory wealth ranking (PWR), community representatives identify and

rank households into socio-economic categories based on acknowledged indicators in a group discussion (Cambers 1999; Bigman *et al.* 2000; Simanowitz 2000; Laderchi 2001; Feulfack & Zeller 2005; Van Campenhout 2006; Hargreaves *et al.* 2007; Collins 2009; Ridde *et al.* 2010a,b). Fourth, geographic targeting (GT) classifies areas or regions into poverty clusters based on the aggregate poverty indicators (Baker & Grosh 1994; Hentschel *et al.* 2000; Minot 2000; Coulombe 2005; Elbers *et al.* 2007).

This study follows up on an empirical study that assessed the effectiveness (inclusion and exclusion errors) of these strategies in urban, rural and semi-urban settings with differing poverty incidence in the central region of Ghana (Aryeetey *et al.* 2010). The study puts these results in a broader context by assessing total costs (including survey costs and costs of premium paid to the poor and non-poor), efficiency (cost per poor identified) and equity (number of poor excluded) of the strategies. We evaluated the feasibility of implementation of the various strategies reflecting their administrative complexities (required skills and capacity to conduct household surveys, community reception of interviewers, and feasibility of community discussions in the wealth ranking process). The research question is: 'How do various strategies – MT, PMT, PWR or GT – perform in terms of efficiency and equity to identify the poor for premium exemptions in Ghana's NHIS, and which strategy is preferable?'

## Methods

### Selection of study setting

We evaluated all strategies in different socio-economic settings (defined by level of poverty and urbanization) as anecdotal evidence suggests that efficiency, equity, and feasibility of strategies might differ across these settings. First, based on the most recent poverty incidence data for Ghana (Coulombe 2005), we selected the poorest district (where 63% of the population live below the income poverty line of GH¢ 370 or US\$264 per year per household), the richest district (where 26% of the population live below the income poverty line) in the central Region of Ghana, and the region's single metropolitan district (where 27% of the population live below the income poverty line). Then, using Ghana's 2000 population census data classification of rural, urban and semi-urban enumeration areas (EA), we randomly selected a semi-urban EA in the poorest district and a rural EA in the richest district and an urban EA in the metropolitan district. Lastly, we randomly selected 146 households in

the urban, 147 households in the rural, and 146 households in the semi-urban settings.

### Data source

We conducted the household survey in the central region of Ghana in June 2009. The household questionnaire contained in total 257 questions of which 91 (35%) related to MT and 65 (25%) related to PMT. The rest were questions that related to household health, health insurance enrolment and perceptions of the health insurance scheme. The MT questions covered detailed household monthly consumption (food and non-food) expenditures; PMT questions covered ownership of durable assets, dwelling and housing conditions. The data sources for PWR were based on the indicators of poverty identified and discussed by selected community informants who participated in a wealth ranking exercise. Up to 17 key informants, 10 men and 7 women, participated in the wealth ranking exercise in each setting. We employed interviewers and facilitators who had skills in conducting household surveys and facilitators with experiences in focus group discussions. They were further trained to familiarize themselves with the objectives of our study. By the principle of GT, no surveys were conducted as the entire population was to be exempted from premium payments. For more details on data collection, see Aryeetey *et al.* (2010).

### Data analysis

For MT, we estimated household wealth through monthly consumption expenditures. Following the definitions in the 2005 Ghana Living Standard Survey (GLSS V), we defined households to be poor in case their expenditures are below GH¢ 370 per year (Ghana Statistical Service, 2007). For PMT, we estimated households' SES index to rank them into poverty quintiles. We first selected household characteristics (such as assets) that were significantly correlated with consumption expenditures, and these were considered as proxies for household wealth. We then used principal component analysis (PCA) to estimate a household SES score. PCA is a statistical procedure to determine weights for a linear index of a set of variables (Filmer & Pritchett 2001; McKenzie 2005; Vyas & Kumaranayake 2006). The household SES score was calculated as the sum of the weight of variables multiplied by their corresponding values. Next, households were ranked into wealth quintiles based on their SES score. We considered the bottom 40% of these households to be poor (for more detail, see Aryeetey *et al.* 2010). In PWR, we counted how often a certain household was ranked in each wealth category and subsequently classified the household into the wealth

quintile it was most frequently ranked in. We repeated this procedure for all households. Households in the two lowest quintiles ('very poor' and 'poor') were considered as poor. In GT, we defined the number of poor households in each setting based on the estimated district poverty incidence (maps) by Coulombe (2005), using the same monthly per capita expenditure threshold as applied in MT.

### Estimates of costs, efficiency and equity

We calculated the time and survey costs of MT, PMT and PWR. As the survey questionnaire contained more questions other than for MT and PMT, we deduced from the questionnaire the specific interview time, travel time and interview days for MT and PMT to estimate their true survey costs. In PWR, we recorded the time spent for community discussions and wealth ranking. The survey

costs consisted of salaries for interviewers and facilitators, transport costs, cost of stationery, data entry and other specific costs incurred in each setting (Tables 1 and 2). For GT, survey costs were zero, and cost estimations were related to only the costs of premium exemptions. In addition, we estimated the efficiency of the strategies as the cost per poor person identified or the cost of exempting one poor person from paying insurance premium (Besley & Kanbur 1993; Houssou & Zeller 2010).

We defined the equity profile of the various strategies in comparison with MT and calculated its indicator by the proportion of poor persons exempted out of the total number of poor (as defined by MT) eligible for exemption. This calculation was facilitated by constructing Venn diagrams to identify households that were consistently identified as being poor across strategies (Aryeetey *et al.* 2010).

**Table 1** Time allocation to strategies to identify the poor in three settings

Detail	Urban			Rural			Semi-urban		
	MT	PMT	PWR	MT	PMT	PWR	MT	PMT	PWR
Number of households (a)	146	146	146	147	147	147	145	145	145
Number of interviewers (b)	5	5	3	5	5	3	5	5	3
Number of days spent per community (c)	7	7	3	7	7	4	7	7	4
Total number of questions in household questionnaire (d)	257	257	–	257	257	–	257	257	–
Number of questions required for MT/PMT (e)	91	65	–	91	65	–	91	65	–
Interviewer's working hours per day including travel hours (f)	8:00	8:00	8:00	8:00	8:00	8:00	8:00	8:00	8:00
Interview time per interviewer in hours (all questions) (g)	0:50	0:50	–	0:53	0:53	–	0:54	0:54	–
Interview time per interviewer (relevant questions) (h) = [(e)/(d)] × (g)	0:17	0:12	–	0:19	0:13	–	0:18	0:13	–
Travel time per interviewer in hours (i) = (k)/(l)	1:05	1:05	6:20	1:06	1:06	4:10	1:07	1:07	5:25
Total interview time per interviewer per day (j) = (h) × (l)	1:42	1:18	–	1:47	1:22	–	1:45	1:20	–
Total travel time per interviewer per day (k) = (i) × (l)	6:17	6:41	–	6:12	6:37	–	6:14	6:39	–
Number of interviews completed in a day (l) = (f)/[(i) + (h)]	5.8	6.18	–	5.64	6.03	–	5.6	5.97	–
Number of interview days (m) = (a)/(l)	25.18	23.64	9	26.07	24.4	12	25.91	24.29	12
Time per household interview in hours (n) = (m)/(a)	4:08	3:53	1:28	4:15	3:58	1:57	4:17	4:01	1:59
Total time for discussion and wealth ranking in hours (PWR only) (o)	–	–	7:45	–	–	6:50	–	–	7:10

MT, means testing; PMT, proxy means testing; PWR, participatory wealth ranking.

<sup>1</sup>Interviewers spent 8 h a day to conduct interview and travel (time spent to make appointments, wait for respondents and all other engagements apart from interview).

<sup>2</sup>The average time spent by interviewer to complete the entire questionnaire.

<sup>3</sup>The interview time was estimated as the proportion of questions required by MT/PMT out of the total questionnaire multiplied by the average time spent by the interviewer to complete the entire questionnaire.

<sup>4</sup>We maintained the same travel time for MT/PMT, which was calculated from the travel time for the entire survey questionnaire.

<sup>5</sup>Total interview time per day was calculated as the number of interviews completed multiplied by the interview time.

<sup>6</sup>Total travel time per day also calculated as the number of interviews completed multiplied by travel time per interviewer.

<sup>7</sup>Number of interviews completed a day by MT/PMT was estimated as number of hours divided by the sum of interview time and travel time.

<sup>8</sup>Interview days for MT/PMT were estimated as the total number of household questionnaires divided by number of interviews completed in a day.

<sup>9</sup>For MT/PMT, the average time per household interview was calculated based on the interview days and number of households. For PWR, it was the average time spent to rank households based on the number of days spent in the setting by the number of households ranked.

**Table 2** Survey costs (US\$) of strategies to identify the poor in three settings

Survey costs	Urban			Rural			Semi-urban		
	MT	PMT	PWR	MT	PMT	PWR	MT	PMT	PWR
Daily wage (a)	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Daily cost of transport (b)	70.39	70.39	70.39	70.39	70.39	70.39	70.39	70.39	70.39
Interviewer's/facilitator's salary (c)	755.30	709.14	270.00	782.05	731.85	360.00	777.26	728.67	360.00
Transport (d)	354.44	332.78	211.17	366.99	343.43	211.17	364.74	341.94	281.56
Stationery (e)	11.25	8.04	37.90	11.25	8.04	37.90	11.25	8.04	37.90
Printing of questionnaires (f)	116.66	83.33		116.66	83.33		116.66	83.33	
Data entry (g)	100.00	71.40	35.00	100.00	71.40	35.00	100.00	71.40	35.00
Community entry (h)	11.70	11.70	11.70	11.40	11.40	11.40	5.70	5.70	5.70
Participants appreciation (i)			35.70			35.70			42.90
Total Survey Cost (j)	1349.34	1216.39	601.47	1388.34	1249.45	691.17	1375.61	1239.07	763.06

MT, means testing; PMT, proxy means testing; PWR, participatory wealth ranking.

<sup>a</sup>Interviewers for MT/PMT and facilitators for PWR were paid daily wages of US\$30.

<sup>b</sup>This included the cost of hiring vehicle, fuel and payment of drivers.

<sup>c</sup>The daily wage multiplied by number of interview days (recorded in Table 1).

<sup>d</sup>Daily cost of transport multiplied by number of interview days.

<sup>e,f,g</sup>For MT/PMT, this was 35%/25% of the total cost of stationery, printing of questionnaire and data entry, respectively. For PWR, we recorded the actual cost of purchase of stationery materials for the three settings.

<sup>h</sup>Cost of community entry included tokens given to community for permission to undertake survey or wealth ranking in the community, payment for announcements and appreciation to a community volunteer for his/her assistance whenever necessary.

<sup>i</sup>Key informants who participated in the PWR exercise were appreciated with some snacks, soaps, etc., for their time spent.

## Results

Tables 1–3 illustrate the successive steps undertaken in estimating costs, equity and efficiency of our strategies in the analysis. The variables used in calculating MT and PMT were collected from the same household questionnaire. Thus, to obtain the separate cost for each strategy, we deduced the time allocations (Table 1) in terms of the number of hours required to complete a questionnaire and the interview days if it would only include questions related to MT or PMT. The number of hours spent for PWR was recorded directly from the community meetings. In the urban setting, for example, the number of interview days with the employment of five interviewers was estimated at 25.18 and 23.64 for MT and PMT, respectively. Further details of the procedure of time allocation are provided at the bottom of Table 1.

Table 2 reports the total survey costs for each strategy and setting. They comprised the interviewers and facilitators' salaries, transport, print and stationery, data entry and other relevant costs incurred during the survey. Total survey costs across the three settings for MT ranged between US\$1349 and US\$1388. For PMT, total survey costs were between US\$1216 and US\$1249. PWR recorded the lowest costs between US\$601 and US\$763.

Table 3 shows the results of the relationship between equity and efficiency estimates. The top half of the table

reports the results of equity analysis. In our analyses, we excluded persons below the ages of 18 years and above 70 years as these are exempted by law (Ghana 2003). Based on the poverty incidence, errors of exclusion and inclusion per setting, we estimated the total number of poor individuals identified by each strategy for exemptions and the numbers of poor excluded and included (columns f, g and h, respectively). Our equity indicator (column i) is calculated as the proportion of the number of poor identified for premium exemption out of the total of number of poor eligible for exemption. The bottom half of Table 3 reports the total cost of exemptions (column l) which is the sum of survey cost and cost of premium (equal to US\$10). The cost of premium exemptions is then calculated as the total number of individuals exempted multiplied by the premium (column k). Our efficiency indicator, the cost per poor person identified, is calculated as the total cost divided by number of poor individuals exempted (column f).

In both urban and rural settings with low-poverty incidence, GT was the most expensive strategy as it exempted all individuals and hence incurred large costs of premium exemptions. GT was equitable as all poor individuals were exempted. PMT and PWR incurred significant survey costs and were costly in terms of paying premium to the non-poor because of relatively large errors of inclusion (in the urban setting, PMT: 36%, PWR: 50%;

**Table 3** Coverage, costs and indicators of efficiency and equity of strategies to identify the poor in three settings

Setting	Strategy	Population eligible for exemptions (a)	Population exemptions (b)	Poverty incidence (c)	Error of exclusion (d)	Error of inclusion (e)	Number of poor individuals exempted (f) = (a) × (b) × (c) × (1-d)	Number of non-poor individuals exempted (g) = (a) × (b) × (e)	Total number of individuals exempted (h) = (f) + (g)	Number of poor excluded (equity indicator) (i) = (a) × (b) × (c) × (d)
Urban	MT	474	0.52	0.27	0.00	0.00	67	0	67	0
	PMT	474	0.52	0.27	0.63	0.36	25	89	114	42
	PWR	474	0.52	0.27	0.50	0.50	33	123	157	33
	GT	474	0.52	0.27	0.00	0.73	67	180	247	0
Rural	MT	667	0.41	0.26	0.00	0.00	71	0	71	0
	PMT	667	0.41	0.26	0.53	0.21	33	57	90	38
	PWR	667	0.41	0.26	0.73	0.17	19	46	65	52
	GT	667	0.41	0.26	0.00	0.74	71	201	272	0
Semi-urban	MT	507	0.46	0.63	0.00	0.00	146	0	146	0
	PMT	507	0.46	0.63	0.46	0.27	79	63	142	67
	PWR	507	0.46	0.63	0.03	0.60	142	139	281	4
	GT	507	0.46	0.63	0.00	0.37	146	86	232	0
Costs US\$										
Setting	Strategy	Survey costs (j)	Cost of premium exemptions (k) = (h) × φ	Total Cost (l) = (j) + (k)	Cost per poor person identified (efficiency indicator) (m) = (l)/(f)					
Urban	MT	1349.34	665.50	2014.84	30.28					
	PMT	1216.39	1133.56	2349.95	95.44					
	PWR	601.47	1565.15	2166.62	65.11					
	GT	0.00	2464.80	2464.80	37.04					
Rural	MT	1388.34	707.55	2095.89	29.62					
	PMT	1249.45	904.04	2153.49	64.76					
	PWR	691.17	653.67	1344.84	70.40					
	GT	0.00	2721.36	2721.36	38.46					
Semi-urban	MT	1375.61	1462.90	2838.50	19.40					
	PMT	1239.07	1416.92	2655.99	33.62					
	PWR	763.06	2812.25	3575.31	25.20					
	GT	0.00	2322.06	2322.06	15.87					

MT, means testing; PMT, proxy means testing; PWR, participatory wealth ranking; GT, geographic targeting.

<sup>a</sup>The total number of individuals recorded in the household survey represented the population in each setting.

<sup>b</sup>The percentage of population eligible for exemptions were individuals between the ages of 18 and 69.

<sup>c</sup>We used the district-based poverty incidence estimated by Coulombe (2005), that related to each setting.

<sup>d,e</sup>The errors of inclusion and exclusion were those estimated from our previous empirical study of accuracy of strategies for the same study setting.

<sup>k</sup>The cost of health insurance premium is US\$10, denoted as φ, based on the minimum amount that the poor pay as premium.

G. C. Aryeetey *et al.* **Cost of identifying poor households**

in the rural setting, PMT: 21%, PWR: 17%) – both strategies were therefore inefficient. Because both strategies also had relatively large errors of exclusion (in the urban setting, PMT: 36%, PWR: 50%; in the rural setting, PMT: 53%, PWR: 73%), they excluded many poor, rendering both strategies not equitable. MT, although having highest survey costs, was the least costly strategy because it incurred no premium exemptions for the non-poor, rendering it the most efficient strategy. It was also equitable as no poor individual was excluded.

In the semi-urban setting with high-poverty incidence, GT included relatively few non-poor (37% compared to 73% in the urban and 74% in the rural setting) rendering it more efficient. Again, PMT and PWR faced survey costs and had large errors of inclusion (27% and 60%, respectively, increasing the cost of inclusion of the non-poor) and therefore high cost per poor person identified. PMT excluded many poor (46%) rendering it inequitable. In contrast, PWR excluded few poor (3%) and was equitable. MT incurred large survey costs, but – by definition – neither excluded poor nor included non-poor individuals. It thus performed well in equity and efficiency.

Table 3 illustrates that there is no equity–efficiency trade-off: in urban, rural and semi-urban settings, both MT and GT are most equitable and MT is most efficient – MT is then the strategy of choice if only equity and efficiency considerations are taken into account. In the semi-urban setting, both MT and GT are most equitable, and GT is most efficient – GT is then the strategy of choice if only equity and efficiency considerations are taken into account.

With reference to feasibility of implementation, experience from our field work revealed that in general,

interviewers were welcomed into the communities without difficulty. However, in the urban setting, PWR facilitators reported that some of the informants were reluctant to participate while others found it difficult to rank their fellow households, possibly because of the low level of social capital making it difficult to know the SES of all households.

### Discussion

For decades, the development of targeting mechanisms to identify potential beneficiaries, particularly the poor, in social welfare programmes has received much attention in policies of developing countries. The argument for targeting is that resources are best allocated to those who need them most. Our study evaluates different strategies to identify the poor for premium exemptions in Ghana's NHIS, in different socio-economic settings. We propose a simple decision framework on the choice of optimal strategy, based on three criteria: equity (numbers of poor excluded), efficiency (cost per poor person identified) and feasibility of implementation (Table 4). We interpret its findings by the poverty incidence per setting.

We recognize MT in relatively low-poverty areas being the most efficient and equitable in our two low-poverty settings. MT has been applied in many studies as a strategy to target the poor for various social programmes (Grosh 1992; Willis & Leighton 1995; Coady *et al.* 2003; Hernandez *et al.* 2007). In some MT programmes such as the Colombia Student Loan Program and Honduras Food Stamps for Female Headed Households, for example, the annual cost per identified beneficiary was US\$700 and

Setting	Poverty incidence	Strategy	Efficiency	Equity	Feasibility	Recommended strategy
Urban	Low	MT	++	++	0	MT
		PMT	–	–	+	
		PWR	0	–	0	
		GT	0	++	+	
Rural	Low	MT	++	++	0	MT
		PMT	–	–	+	
		PWR	0	–	+	
		GT	0	++	+	
Semi-urban	High	MT	0	++	0	GT
		PMT	–	–	+	
		PWR	0	+	+	
		GT	++	++	+	

**Table 4** Decision framework on optimal strategy to identify the poor on the basis of efficiency, equity and feasibility

MT, means testing; PMT, proxy means testing; PWR, participatory wealth ranking; GT, geographic targeting.

–, worst performance; 0, weak performance; +, good performance; ++, excellent performance.

US\$40 within a beneficiary population of 48 000 and 125 000, respectively (Betancur-Mejia 1990; Franklin 1990; Ballenger & Courtney 1991), which is similar to what we found in our study. The potential drawback of MT is that it requires highly skilled administrative capacity to ensure that accurate data are obtained – a capacity that is insufficient in many developing countries including Ghana and makes the feasibility of MT a challenge. PMT may be considered as an alternative to MT in settings where administrative capacity is limited. Many social development programmes that require identification of poor beneficiaries have applied PMT as the targeting mechanism notwithstanding the reported high exclusion errors. In a comparative study of five Latin American countries on various social targeting programmes, the exclusion errors ranged between 26% and 84%. (Castaneda 2005; Castaneda *et al.* 2005; De la Briere & Lindert 2005; Dutrey 2007). Proponents of PMT argue that PMT is relatively simple to administer and does not require huge administrative burden and skilled capacity in comparison with MT (Montgomery *et al.* 2000; Filmer & Pritchett 2001; McKenzie 2005).

We recognize GT as an optimal strategy in relatively high-poverty incidence settings, because the cost of including the non-poor is then less than survey costs of MT, PMT or PWR. GT is only feasible in settings where accurate poverty incidence data have been estimated. At the present poverty incidence of 63% in the semi-urban setting, GT is more efficient than MT. In general, the definition of the poverty incidence ‘threshold’ above which GT is the most efficient strategy in any particular setting depends on population numbers, survey costs of the other strategies and their inclusion and exclusion errors and can be mathematically calculated. GT has been widely used to design poverty maps for Ghana and to target the poor in other countries in sub-Saharan Africa (Bigman *et al.* 2000; Fofack 2000; Simler & Nhate 2003; Kraybill & Bashaasha 2006).

For the purposes of large-scale policy intervention, as in Ghana’s NHIS, where the focus is on exemption from payment of a fee rather than the more complex issues of stigma, social exclusion and marginalization were relatively matters; PWR may not be a useful strategy to adopt in comparison with the other strategies. PWR is rather subjective because definitions and perceptions of poverty are community specific even though poverty indicators are sometimes similar. Nonetheless, through the application of various participatory poverty assessment tools, the subjectivity of the poverty ranking results of key informants can be minimized, thereby curtailing PWRs disadvantages. The application of PWR is best in rural communities where people are likely to know the SES of

their fellow community members. In Burkina Faso, for example, community-based targeting has been applied, and its feasibility tested to exempt the worst off from user fees in some selected rural communities (Ridde *et al.* 2010a,b; Soures *et al.* 2010). One study reported that ‘the community-based process minimized inclusion biases, as the people selected were poorer and more vulnerable than the rest of the population. However, there were significant exclusion biases; the selection was very restrictive because the waivers had to be endogenously funded’. They also identified the procedure’s emphasis on local solidarity and democracy that may limit its possible scale-up (Ridde *et al.* 2011, p. 6). Our study draws similar conclusions particularly on the limitation of using community-based targeting mechanism for scale-up to regional or national level.

A number of issues are important in the interpretation of the results. First, the study was conducted in one of the 10 regions of the country, which may not be representative of Ghana’s population. However, it is possible to repeat the procedure with data from a representative sample of the population. The GLSS, which is carried out on regular basis, includes the essential data requirements to estimate poverty incidence needed for GT and equity and efficiency needed for PMT. Second, our results were limited to analysis of low-poverty incidence urban and rural settings and a high-poverty semi-urban setting. The results might differ if high-poverty incidence urban and rural and low-poverty incidence semi-urban were included in the analysis. Third, we did not include community time costs in our analysis because of the difficulties in measuring such costs (Dutrey 2007). Because MT, PMT and PWR rely on community time inputs, including community costs would render these strategies more expensive in comparison with GT. Fourth, in our costs estimates, we also excluded the psychological and social cost associated with applying for and receiving state support, economic losses because of disincentive effects and any loss of political support for the programme (Grosh 1994; Gwatkin 2000; Smith & Subbarao 2003). These costs are difficult to quantify and are best considered qualitatively.

In conclusion, the equity, efficiency and feasibility of different strategies to identify the poor for exemption from fee payments vary somewhat depending on the socio-economic setting. The ability to administer is also an important consideration. Generally, where the incidence of poverty is high, GT is likely to be the best approach. In lower-poverty incidence settings, MT may be the best approach with the caveat that the ability to administer this more technically challenging approach must be there. Failing this, PMT will be a better strategy. PWR is of limited value where the reason for identifying the poor is

G. C. Aryeetey *et al.* **Cost of identifying poor households**

for a clear straightforward decision related to exemptions from fee payment. However, where more complex programmes that require consideration of poverty from a relativist angle because of issues of marginalization, stigma, etc., PWR is worth considering.

This study was carried out as a follow-up on review and empirical studies on strategies to identify the poor for premium exemptions in Ghana's NHIS. It holds relevance to other social and developmental programmes that require identification and exemptions of the poor in low-income countries.

## References

- Ahmed UA & Bouis HE (2002) Weighing what's practical: proxy means tests for targeting food subsidies in Egypt. *Food Policy* 27, 519–540.
- Aryeetey GC, Jehu-Appiah C, Spaan E, D'Exelle B, Agyepong I & Baltussen R (2010) Identification of poor households for premium exemptions in Ghana's National Health Insurance Scheme: empirical analysis of three strategies. *Tropical Medicine and International Health* 15, 1544–1552.
- Baker JL & Grosh ME (1994) *Measuring the Effects of Geographic Targeting on Poverty Reduction*. World Bank, Washington, DC.
- Ballenger N & Courtney H (1991) *Revisiting Surplus Food Programs after Surpluses: The Temporary Emergency Food Assistance Program and Its Role in the District of Colombia*. World Bank, Washington, DC.
- Betancur-Mejia G (1990) *Colombian Institute of Educational Credit and Training Abroad: Assessment of its Experiences over 40 Years and Their Replicability*. World Bank, Latin America and Caribbean Technical Department, Washington, DC.
- Besley T & Kanbur R (1993) *The Principles of Targeting*. The World Bank, Washington, DC.
- Bigman D, Dercon S, Guillaume D & Lambotte M (2000) Community Targeting for Poverty Reduction in Burkina Faso. *The World Bank Economic Review* 14, 167–193.
- Booyesen F, Van der Berg S, Burger R, Von Maltitz M & Du Rand G (2008) Using an asset index to assess trends in poverty in seven Sub-Saharan African countries. *World Development* 36, 1113–1130.
- Cambers R (1999) *Values, Norms and Poverty*. Consultation on WDR 2000/1, Poverty and Development, Johannesburg, South Africa.
- Castaneda T (2005) *Targeting Social Spending to the Poor with Proxy-Means Testing: Colombia's SISBEN System*. World Bank, Washington, DC.
- Castaneda T, Lindert K, De la Briere B *et al.* (2005) *Designing and Implementing Household Targeting System: Lessons from Latin America and the United States*. World Bank, Washington, DC.
- Coady DP & Parker SW (2005) *Program Participation under Means-Testing and Self-Selection Targeting Methods*. Discussion Paper 191. IFPRI, Washington, DC.
- Coady DP, Grosh M & Hoddinott J (2003) *The Targeting of Transfers in Developing Countries: Review of Experience and Lessons*. The World Bank, Washington, DC.
- Collins SB (2009) An understanding of poverty from those who are poor. *SAGE Publications* 3, 9–31.
- Coulombe H (2005) *Ghana Census-Based Poverty Maps: District and Sub-District level Results*. Ghana Statistical Service and DfID, Accra Ghana.
- De la Briere B & Lindert K (2005) *Reforming Brazil's Cadastro Unico to Improve the Targeting of the Bolsa Familia Program*. Social Protection Discussion Paper Series No 527. World Bank, Washington, DC.
- Deaton A (1997) *The Analysis of Household Surveys: A Micro Econometric Approach to Development Policy*. Johns Hopkins University Press and the World Bank, Washington, DC.
- Dutrey AP (2007) *Successful Targeting? Reporting Efficiency and Costs in Targeted Poverty Alleviation Programmes*. United Nations Research Institute for Social Development (UNRISD), Switzerland.
- Elbers C, Fujii T, Lanjouw P, Ozler B & Yin W (2007) Poverty alleviation through geographic targeting: how much does disaggregation help? *Journal of Development Economics* 83, 198–213.
- Feulack J & Zeller M (2005) *How Accurate is Participatory Wealth Ranking (PWR) in Targeting the Poor? A Study from Bangladesh*. Conference on International Agricultural Research and Development, Stuttgart-Hohenheim.
- Filmer D & Pritchett L (2001) Estimating wealth effects without expenditure data or tears: an application to educational enrollments in states of India. *Demography* 38, 115–132.
- Fofack H (2000) Combining light monitoring surveys with integrated surveys to improve targeting for poverty reduction: the case of Ghana. *The World Bank Economic Review* 14, 195–219.
- Franklin R (1990) *Targeting Poverty Groups in Honduras: Some Preliminary Estimates and Scenarios*. World Bank, Regional Unit for Technical Assistance, Washington, DC.
- Ghana (2003) *National Health Insurance Act (Act 650)*. Ghana Publishing Company Limited, Accra, Ghana.
- Ghana (2004) *National Health Insurance Regulation (LI 1809)*. Ghana Publishing Company Limited, Accra, Ghana.
- Ghana Statistical Service (2007) *Trends and Patterns of Poverty in Ghana, 1990–2005*. Report of the Ghana Living Standards Survey, Ghana Statistical Service, Ghana.
- Grosh M (1992) The Jamaican food stamp program: a case study in targeting. *Food Policy* 17, 17–40.
- Grosh M (1994) *Administering Targeted Social Programs in Latin America. From Platitudes to Practice*. The World Bank, Washington, DC.
- Gwatkin D (2000) *The Current State of Knowledge About Targeting Health Programs to Reach the Poor*. The World Bank, Washington, DC.
- Hargreaves J, Morison AL, Gear JSS *et al.* (2007) Assessing household wealth in health studies in developing countries: a comparison of participatory wealth ranking and survey



G. C. Aryeetey *et al.* **Cost of identifying poor households**

- techniques from rural South Africa. *Emerging Themes in Epidemiology* 4, 4; doi: 10.1186/1742-7622-4-4.
- Hentschel J, Olson Lanjouw J, Lanjouw P & Poggi J (2000) Combining census and survey data to trace the spatial dimensions of poverty: a case study of Ecuador. *The World Bank Economic Review* 14, 147–165.
- Hernandez M, Pudney S & Hancock R (2007) The welfare cost of means-testing: pensioner participation in income support. *Journal of Applied Econometrics* 22, 581–598.
- Houssou N & Zeller M (2010) *To Target or Not to Target? The Cost Efficiency of Indicator-Based Targeting*. Agricultural & Applied Economics Association Joint Annual Meeting, Denver, Colorado.
- Jehu-Appiah C, Aryeetey G, Spaan E, Agyepong I & Baltussen R (2010) Equity, efficiency and feasibility of strategies to identify the poor: an application to premium exemptions in Ghana's National Health Insurance. *Health Policy* 95, 166–173.
- Johannsen J (2006) *Operational Poverty Targeting in Peru-Proxy Means Testing with Non Income Indicators*. International Poverty Center UNDP Working Paper Number 30, 2006. Washington, DC.
- Kraybill DS & Bashaasha B (2006) The potential gains from geographical targeting of anti-poverty programs in Uganda. *African Journal of Agricultural Resource Economics* 1, 37–48.
- Laderchi CR (2001) *Participatory Methods in the Analysis of Poverty: A Critical Review*. QEH Working Paper Series 62. University of Oxford, Oxford, UK.
- Lindert K (2005) *Implementing Means-Tested Welfare Systems in the United States*. Social Protection Discussion Paper Series No. 532. World Bank, Washington, DC.
- McKenzie DJ (2005) Measuring inequality with asset indicators. *Journal of Population Economics* 18, 229–260.
- Minot N (2000) Generating disaggregated poverty maps: an application to Vietnam. *World Development* 28, 319–331.
- Montgomery M, Gragnolati M, Burke K & Paredes E (2000) Measuring living standards with proxy variables. *Demography* 37, 155–174.
- Ridde V, Haddad S, Nikiema B, Ouedraogo M, Kafando Y & Bicaba A (2010a) Low coverage but few inclusion errors in Burkina Faso: a community-based targeting approach to exempt the indigent from user fees. *BMC Public Health* 10, 631.
- Ridde V, Yaogo M, Kafando Y *et al.* (2010b) A community based targeting approach to exempt the worst-off from user fees in Burkina Faso. *Journal of Epidemiology and Community Health* 64, 10–15.
- Ridde V, Yaogo M, Kafando Y *et al.* (2011) Targeting the worst-off for free health care: a process evaluation in Burkina Faso. *Evaluation and Program Planning* 34, 333–342.
- Sahn DE & Stifel D (2003) Exploring Alternative Measures of Welfare in the Absence of Expenditure Data. *Review of Income and Wealth Series* 49, 463–489.
- Simanowitz A (2000) Targeting the poor – comparing visual and participatory methods. *Small Enterprise Development*, 11, 22–39.
- Simler RK & Nhate V (2003) *Poverty, Inequality, and Geographic Targeting: Evidence from Small-Area Estimates in Mozambique*. IFPRI, Washington, DC.
- Smith WJ & Subbarao K (2003) *What Role for Safety Net Transfers in Very Low Income Countries?* The World Bank, Washington, DC.
- Soures A, Savadogo G, Dong H, Parmar D, Sie A & Sauerborn R (2010) Using community wealth ranking to identify the poor for subsidies: a case study of community based health insurance in Nouna Burkina Faso. *Health and Social Care in the Community* 18, 363–368.
- Stierle F, Kaddar M, Tchicaya A & Schmidt-Ehry B (1999) Indigence and access to health care in sub-Saharan Africa. *International Journal of Health Planning and Management* 14, 81–105.
- Van Campenhout B (2006) Locally adapted poverty indicators derived from participatory wealth rankings: a case of four villages in rural Tanzania. *Journal of African Economies* 16, 406–438.
- Vyas S & Kumaranayake L (2006) Constructing socio-economic status indices: how to use principal components analysis. *Health Policy and Planning* 21, 459–468.
- Willis CY & Leighton C (1995) Protecting the poor under cost recovery: the role of means testing. *Health Policy and Planning* 10, 241–256.

**Corresponding Author** Genevieve Cecilia Aryeetey, Radboud University Nijmegen Medical Center, Nijmegen, The Netherlands.  
E-mails: G.Aryeetey@elg.umcn.nl; cecearyeetey@yahoo.co.uk