Impacts of a social protection program paired with fee waivers on enrolment in Ghana's National Health Insurance Scheme

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Abstract

Cash transfer programs, which aim to reduce poverty and improve human capital investment have been found to have limited impacts on health outcomes, suggesting that complementary programming and linkages to health services may be necessary.

We implemented a quasi-experimental, mixed method impact evaluation of Ghana's Livelihood Empowerment Against Poverty (LEAP) 1000 program, an integrated social protection program pairing cash transfers for poverty reduction with fee waivers for enrolment into Ghana's National Health Insurance Scheme (NHIS) and intent-to-treat impacts on NHIS enrolment among children and adults.

Results indicate that LEAP 1000 increased current NHIS enrolment by 14 and 15 percentage points for children and adults, respectively. Common reasons for not enrolling are cost related, including fees and travel. Gaps in enrolment still remain, particularly for adults. These gaps and implementation challenges suggest that NHIS and LEAP could be better streamlined to ensure that all poor households fully benefit from both services.

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Introduction

Poverty is a determinant of both poor health status and reduced access to health care services, compounding the former. Increasingly, social protection programs are being implemented globally to reduce poverty and promote increased investment in human capital development, including health [1]. One of the most common types of social protection programming is cash transfers, particularly in sub-Saharan Africa. A robust body of literature demonstrates positive impacts of cash transfer programs on household well-being related to poverty reduction and food security, among other determinants of health [2-4], yet the impacts of cash transfers on health status is mixed [2]. This existing body of literature comes largely from Latin America, where cash transfer programs tend to be conditional on health check-ups and other "co-responsibilities", whereas African programs are largely unconditional, meaning there are no behavioral requirements to maintaining eligibility. Thus, impacts on health-related outcomes may vary based on context and program design. Generally, existing studies find positive impacts on utilization of health services, but fewer impacts on actual improved health status [2, 5-7].

Thus, to mitigate the impact of poverty on health, additional programs or linkages to services are needed. One type of complementary programming is health insurance coverage, which is a crucial step in achieving SDG 3 (Ensure healthy lives and promote wellbeing for all at all ages), and linking cash transfers with health insurance is an example of integration of social protection programs. Indeed, such types of integrated programming (often referred to as "cash plus" in the context of cash transfers) are increasingly being piloted [8]. However, few of these combined cash and plus components have been rigorously evaluated. Further, studies exist examining cash incentives or subsidies for enrolling into health insurance, including in Ghana [9], but the question of whether a large-scale government-run cash transfers aimed at poverty reduction linked with fee waivers can induce beneficiaries to enroll in health insurance has not been examined. The current study contributes to filling this gap.

In the past 15 years, the Government of Ghana has implemented two major policy initiatives to address the intersection of poverty and health. In 2003, government passed the National Health Insurance

Act (Act 650), established a National Health Insurance Authority (NHIA) and implementation of the National Health Insurance Scheme (NHIS) began in 2004. The NHIS program aims to remove cost barriers to accessing care and covers out-patient and in-patient services, dental services, and maternal health services. The NHIA actively seeks out opportunities to enroll poor and vulnerable persons onto the scheme, as illustrated by their program goals and targeted outreach to enroll members under the 'indigent' exemption [10]. By 2014, coverage was estimated at approximately 40% of the population, 14% of whom were eligible as indigents [11]. Nevertheless, despite considerable progress in uptake, significant gaps remain, including limited knowledge of the scheme's services and conditions, long waiting times and inadequate staffing of health care workers across the country, limiting access to healthcare among the poorest and most marginalized segments of the population [11].

In a second major initiative, to address extreme poverty, the Ministry of Gender, Children and Social Protection (MoGCSP) has implemented a large-scale social protection program, the Livelihoods Empowerment Against Poverty (LEAP), since 2008. LEAP program provides bimonthly cash payments to extremely poor households with orphans and vulnerable children, elderly with no productive capacity, persons with severe disability, and, after the LEAP 1000 pilot (starting in 2015), those containing a pregnant woman or child under the age of 12 months. As of December 2017, LEAP reached more than 213,000 extremely poor families in all 216 districts of Ghana. In a step towards better integration of social protection programming, the NHIA and the MoGCSP collaborated in 2011 to enroll beneficiaries of LEAP onto the NHIS. LEAP beneficiaries qualify for the NHIA "indigent" exemption which waives all NHIS fees, including those for card processing, premiums and renewals.

Social protection serves to both mitigate shocks and to address structural deprivations associated with chronic poverty [12]. The LEAP combination of cash transfers plus NHIS coverage aims to address structural deprivations, and may ultimately be an example of a transformative social protection scheme. Social protection measures such as regular cash payments can be classified as "protective," insurance as "preventive," and if the combination of the two results in increases in equity and a reduction in social

exclusion (for example from accessing health services), then this integrated approach is a step towards "transformative" change [12, 13].

In the current mixed methods study, we examine the impacts of LEAP 1000, including the cash transfers and NHIS fee waiver, on enrolment in the NHIS, a first key step in reducing barriers to health access. The aforementioned literature examining the impacts of cash transfers on health services utilization and health status to date are extremely limited in their coverage of African government programs, thus this study contributes to filling this gap. In addition, Ghana is at the forefront on integrated social protection programming in Africa and to our knowledge this is the first study to examine a government program in Africa which combined cash with a health insurance fee waiver.

Methods

Study setting and design

Data come from the impact evaluation of the Ghana LEAP 1000 program [14]. The LEAP 1000 pilot added a fourth eligibility category to Ghana's LEAP cash transfer program, namely that of poor families with pregnant women or infants under one year old, aiming to reach poor children in the first 1000 days of their lives with to improve their nutrition and development. Infants under 15 months were accepted as eligible to avoid excluding children due to variations in quality of birth date data and/or the extended duration of the targeting process. Now integrated into the LEAP program nationally, LEAP 1000 was originally piloted in ten districts in northern Ghana. The LEAP 1000 evaluation was carried out by UNICEF Office of Research – Innocenti, the University of North Carolina at Chapel Hill, the Institute of Statistical, Social and Economic Research (ISSER) of the University of Ghana, and Navrongo Health Research Center. The study is a longitudinal, mixed method study comprising quantitative and qualitative components.

The impact evaluation covered five of the original ten LEAP 1000 pilot districts (Yendi, Karaga, East Mamprusi in the Northern Region and Bongo and Garu Tempane in the Upper East Region), and these were purposively selected to reflect demographic diversity of districts comprising the pilot. To

identify a comparison group, the evaluation exploited the program eligibility score (proxy means test, PMT) used in the targeting phase to identify eligible participants, and collected data only on those households close to the cut-off for maximum comparability. This design is inspired by the regression continuity approach which focuses on the observations near the cut-off to mimic a randomized control trial) [15]. The PMT took into account household poverty-related characteristics, including assets, dwelling characteristics, number of household members, etc. The threshold for program eligibility was determined by the government after PMT data was collected based on the budget available to enroll approximately 6,000 households to receive transfers for at least three years. Households falling below the cut-off, those classified as extremely poor by the PMT, were enrolled in the program. The study was powered to detect program impacts on child health and nutrition outcomes, with an estimated required sample size of 2,500 households, half from the comparison group (above the PMT cut-off) and half from the treatment group (below the PMT cut-off). The baseline survey was conducted in July-September 2015 with 2,497 women that were pregnant at the time of the targeting exercise or had a child younger than 15 months of age. Of these households, 2,331 were re-interviewed at endline, which was implemented between June and August 2017.

For the qualitative component of the evaluation we sampled a cohort of 20 beneficiary women from the treatment arm and conducted in-depth interviews at baseline, 12 and 24 months' follow-up. At the 12 and 24-month follow-up interviews, we also interviewed male partners of beneficiaries. The purposive sample of the embedded cohort focused on geographic location (remote v. closer to markets) and parity (first time mother vs women with 3+ children) to facilitate comparative analysis.

The quantitative component underwent ethical review by the Ethics Committee for the Humanities of the University of Ghana and the qualitative component underwent review by the University of North Carolina at Chapel Hill (UNC-CH) Institutional Review Board and the NHRC Institutional Review Board. The trial is registered in the International Initiative for Impact Evaluation's (3ie) Registry for International Development Impact Evaluations (RIDIE-STUDY-ID-55942496d53af).

Measures

The main outcome variables examined in this study are whether individuals are currently enrolled in NHIS and whether they have ever been enrolled. For each individual in the household aged five years and above, a series of questions were asked to the main survey respondent. First, respondents were asked if the individual was covered under any health insurance scheme, and NHIS was a response option, along with Mutual Health Organization/Community-based Health Insurance, other Privately Purchased Health Insurance, or other health insurance. Then respondents were asked if the individual had ever been enrolled in NHIS (endline only). Finally, respondents were asked whether the individual holds a valid NHIS card (main outcome examined in the current analysis). Analysis ever enrolment allowed us to further disaggregate those that were not enrolled at endline into those never enrolled and those previously enrolled but not currently holding a valid NHIS card at endline. For those not currently enrolled, we examine reasons for not being enrolled. Response options included that the premium was too expensive, respondent did not realize the card expired, travel time or related cost was too high, lack of awareness that card must be renewed annually, respondent had not been sick, waiting times at renewal location are too long, perceived poor quality of NHIS/preferred services not covered, NHIS office was closed, and other reasons (including card lost, no time, etc.).

Controls used in our analyses include individual- and household-level characteristics. At the individual level, we controlled for gender, age and age squared in years. At the household-level, we controlled for age, gender and education (no formal education versus some education) of the household head; household size and proxy means test score.

The focus of the qualitative interviews was eliciting the narrative of impact within each household and obtaining context to facilitate interpretation of impact, or lack thereof. We used a semi-structured guide, audio-recorded and transcribed verbatim all interviews. We specifically probed on

experiences with enrollment and renewal in NHIS at each of the interviews. All interviewers and participants were matched on gender and local language preference.

Statistical analyses

We restricted our statistical analysis to the sample of individuals that were interviewed both at baseline and endline, and we stratified analyses by age, namely for children (individuals aged 5 – 15 at baseline) and for adults (individuals aged 16 and above at baseline and thus aged 18 years and above by endline).

We first examined balance among background characteristics and the outcome variable at baseline between treatment and comparison individuals in our analysis sample. Then we investigated if attritors differed in background characteristics by treatment status (differential attrition), which could threaten internal validity and unbiasedness of our estimates.

Next, we conducted bivariate analyses to examine background characteristics associated with enrolment status, controlling for the PMT. Categories of enrolment in NHIS were classified as follows: 1) currently enrolled, 2) currently not enrolled but previously enrolled (ever) and 3) never enrolled. We then described reasons why individuals did not (re)enroll in NHIS.

To estimate causal impacts of the program, we utilized the quasi-experimental design of the study, which exploited the PMT score cut-off for program eligibility in an RDD-inspired estimation strategy. The success in the implementation of an RDD necessitates that 1) participants were not able to manipulate their PMT score, 2) the threshold is determined independently of the rating variable, and 3) no discontinuities are present other than the treatment status in baseline characteristics and outcomes. Satisfaction of these requirements is documented in the baseline evaluation report (LEAP 1000 Evaluation team, 2016). Since the data were collected only for those near the cut-off, the estimates will be valid only for that particular population (local average treatment effects). As these households are not the poorest among the total eligible distribution, these results represent a lower bound of program impact.

To estimate treatment impacts of LEAP 1000 on NHIS enrolment, we utilized a difference-in-differences (DID) approach as specified in equation 1.

$$Y_{ijt} = \beta_0 + \beta_1 P_{ij} + \beta_2 T_t + \beta_3 P_{ij} * T_t + \beta_4 X_{ijt} + \lambda_j + \varepsilon_{ijt} \quad (1)$$

Where Y_{ijt} is a binary variable indicating whether individual *i* residing in community *j* is enrolled in NHIS in year *t*. P_{ij} is a dummy indicator for individual's *i* participation into LEAP 1000, equal to 1 if his or her household is assigned to treatment and 0 otherwise. T_t is a time binary variable, set to 1 if the observation is from the endline survey, and to 0 if it is from the baseline. $P_{ij} * T_t$ is the interaction term between the program and the time dummy. X_{ijt} includes a set of observed individual and household characteristics, including the PMT score. The model finally controls for community fixed effects, λ_j, to absorb unobserved-time invariant characteristics of the communities. ε_{ijt} represents the error term. The parameter of interest for this study, β_3, is the intent-to-treat (ITT) impact estimate. Standard errors were clustered at the community level. A key assumption in the DID estimation model is that treatment and comparison groups experience parallel trends over time, and this holds in the current study as both study arms were sampled from the same communities. As a robustness check, we estimated average treatment on the treated (ATT) impacts, using an instrumental variables approach to predict program take-up, with the instrument being program eligibility as per the PMT cut-off.

For the qualitative analysis, we first developed a longitudinal summary for each household, integrating women's and men's interviews when both were available, to capture the narrative of impact over time. We summarized patterns in enrollment and renewals across household members and coded for topics related to NHIS using Atlas.ti software.

Results

At baseline, data for 4,736 children and 6,865 adults were reported, while at endline 4,197 and 6,130 of these children and adults, respectively, were still part of the sample households, resulting in 11 per cent overall attrition for both age groups (Appendix 1). Attrition rates were similar between

comparison and treatment groups (for both age groups), indicating no threat to internal validity of the study. Further, attrition by background characteristics and the outcomes at baseline did not vary between treatment and comparison groups (Appendix 2).

The child sample is comprised of 46.6 percent females, and the average age is 8.9 years, while the adult sample is comprised of 56.3 percent females, and the average age is 36.7 years. Households are on average composed of 7.5 members, and 6 percent of households have female heads. Further, 81.8 percent of heads have no formal education (figures comprise averages calculated from values in Columns 2 and 5, Appendix 2).

Over the study period, NHIS enrolment increased among the treatment group from 36.1 percent at baseline 36.1 to 45.7 percent at endline, and decreased among the comparison group from 36.6 percent to 33.3 percent; Figures 1 and 2).

Bivariate analyses indicate that characteristics positively associated with enrolment included younger age (current and ever), female (current and ever), higher head education levels (current and ever), female headship (current and ever), smaller households (current and ever), and Karaga district (ever; Table 1). There were no differences in enrolment by extreme poor status.

Among those who had previously enrolled but did not have a current NHIS card at endline, the most commonly reported reasons were enrolment fee/premium was too expensive (75.32 percent; Table 2), not realizing card expired (11.36 per cent), and travel time/travel cost was too high (9.28 percent). In the qualitative interviews, participants identified several barriers to renewal including long wait times, competing demands with work, cost of transport, and poor road conditions. Cost was also a salient barrier, reflecting both the extreme poverty of participants as well as confusion about their NHIS fee exemption status. As a male participant in Bongo stated simply, "*That money is not even enough to register for the children and the woman."*

Reasons among those who had never enrolled were similar: 65.44 per cent report enrolment fee/premium too expensive, 14.94 per cent report travel time/travel cost too high, and then the next most commonly reported reasons were related to waiting times (Table 2). Some participants described that the LEAP program had come to their house to take their cards for renewal, thus eliminating some of the aforementioned barriers. Others described using their LEAP cash transfer to pay for renewal and viewed LEAP as facilitating their enrolment or renewal due to the cash provided by the program.

Qualitative findings echoed the gender patterns from the quantitative analyses, with both women and men indicating that women and children were the priority for enrolment. While most participants had a positive perception of the benefits of NHIS, at baseline several discussed never having enrolled because they questioned the quality of the coverage for not including enough services and medication. There were also some concerns about the quality of care for people using NHIS versus those paying for services, as reflected by a mother in Karaga in her baseline interview,

> *"Some people say when you visit the hospital with it the doctors don't want to attend to you but if you do not have one, that one they will attend to you. This is the reason why we aren't interested in it."*

Notably, she was enrolled by the endline interview, reflecting on the potential impact of the integrated LEAP and NHIS program on improving acceptance and reducing barriers to NHIS enrolment.

Impact estimates indicate that LEAP 1000 increased current NHIS enrolment by 14 and 15 percentage points for children and adults, respectively (Table 3). Further, LEAP 1000 increased the proportion of adults reporting having ever been enrolled by 7 percentage points (Table 4). The impact on ever enrolment was not significant for children.

In terms of both enrolment and renewal, most participants reflected a positive experience or perceptions of NHIS as a way to save costs on health care. Among those who had used NHIS, nearly all were satisfied and felt that having insurance had helped them to save money when seeking healthcare. A

mother in Karaga identified NHIS enrolment as a major component of LEAP impact, which she further linked to overall poverty reduction,

> *Now the LEAP 1000 has given us the chance to register for the NHIS and reduced the poverty levels of mothers. It was a big problem for most mothers to get money and register for the NHIS but now it is easy for all beneficiaries of the LEAP programme.*

This sentiment was echoed by other mothers who appreciated that being in LEAP had allowed them to enroll and/or renew their families in NHIS and take better care of their family's health. Some participants discussed lack of medication and other supplies as a barrier to getting care even when you have insurance, reflecting health systems challenges beyond NHIS as reflected by a father in Bongo, *"You know the insurance, when we sent the child, they gave us a prescription to buy medicine because there was no medicine in the hospital."*

Some participants mentioned that in cases like this, they could use their LEAP money to purchase medication, which helped to protect their children's health.

Discussion

This study demonstrated that LEAP 1000, a social protection program implemented by the Government of Ghana pairing cash transfers with fee waivers for national health insurance enrolment, increased enrolment into a national health insurance scheme among both children and adults. This program provides an important example of integrated social protection programming, with rigorous evidence demonstrating that its intended aims are in part being achieved.

While impacts on enrolment were considerably large, gaps in enrolment remain, particularly for adults. Reasons for not having valid NHIS enrolment were largely related to high perceived costs of the premium or travel time and related costs to enrolment sites. The salience of cost as a perceived barrier reflects insufficient communication and/or misunderstanding of the integration with LEAP and highlights the need to improve communication with both program participants and program implementers to

maximize the linkages between LEAP and NHIS. By ensuring that the integrated program is implemented well, participants will be protected from using their transfer to purchase insurance, possibly increasing impacts in other aspects of their wellbeing.

During the course of this study, MoGCSP made a targeted effort to enroll LEAP households onto NHIS in 2016 via an information campaign and made arrangements to facilitate movement of LEAP household members to NHIA offices. However, implementation of NHIS/LEAP integration still faces challenges. For example, some NHIA officers misunderstand the entitlement to NHIS fee waivers and charged LEAP households for enrolment/renewal. Additionally, the annual renewal requirement for NHIS can be difficult for poor families to comply with, often resulting in LEAP households letting their NHIS benefits lapse or expire. Such gaps demonstrate operational issues within both programs that could be better streamlined or adjusted to ensure that all poor households fully benefit from both services. One possible adjustment would be to extend the validity period for NHIS beyond one year for LEAP households, thereby reducing the financial and time burden for households to travel to renew cards annually. Also, data systems could be linked, allowing field officers such as District Social Welfare Officers to track NHIS enrolment and validity along with their routine LEAP monitoring. Finally, better orientation could be provided to the NHIA workers, ensuring that they do not mistakenly charge fees to exempt LEAP households.

Our findings contribute to the literature on cash transfers for poverty reduction and health. Virtually all studies to date on this topic have looked at impacts on morbidity and use of health facilities[2], and our study contributes to filling the gap in evidence on impacts of enrolment into health insurance schemes, and also contributes to providing evidence on "cash plus" or integrated social protection programs.

One limitation of this study is that impact estimates are likely lower bounds of program impacts, given that the population studied is close to the eligibility cut-off and our estimation strategy estimates

local average treatment impacts among a group which is relatively "better off" than other LEAP households further from the eligibility cut-off and thus poorer.

Future research should investigate impacts of this integrated social protection program on healthcare seeking and ultimately, morbidity. Implications of our findings for programming underscore the need to improve education around program enrolment, the annual need for re-enrolment, and beneficiaries' exemption from paying premiums. Such findings have implications for both Ghana and for other countries in the region looking to integrate their cash transfer programs with access to health services, which must be done not only at policy level but also with practical implementation modalities for the end user.

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Figure 1: Proportion of children (5-17 years old) with valid NHIS card for the current year

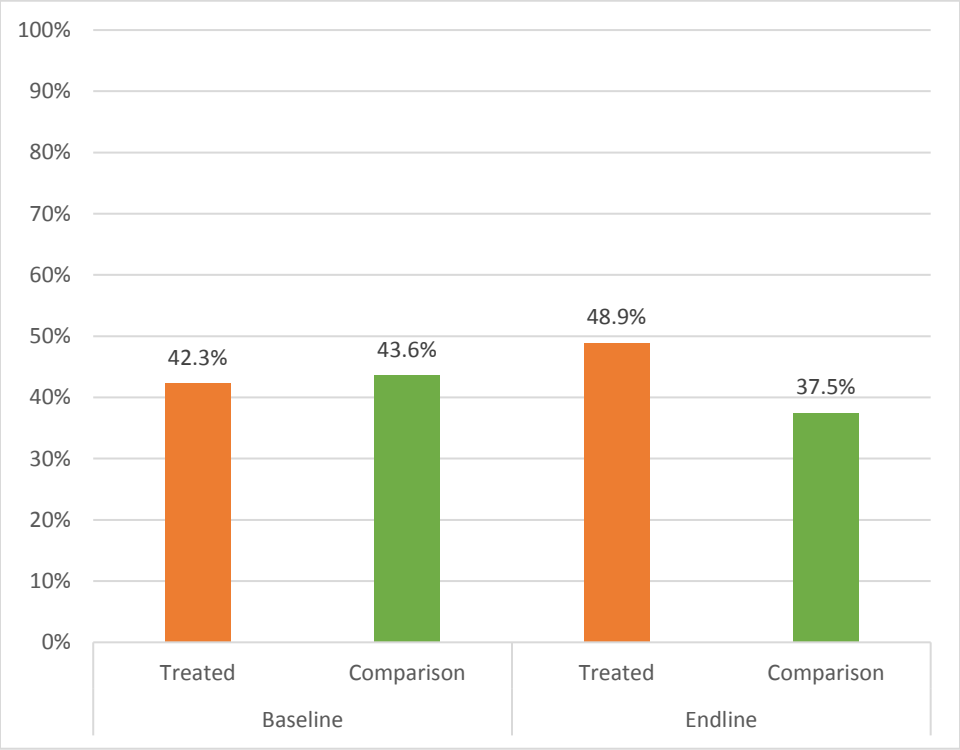

Figure 2: Proportion of adults (18+ years old) with valid NHIS card for the current year

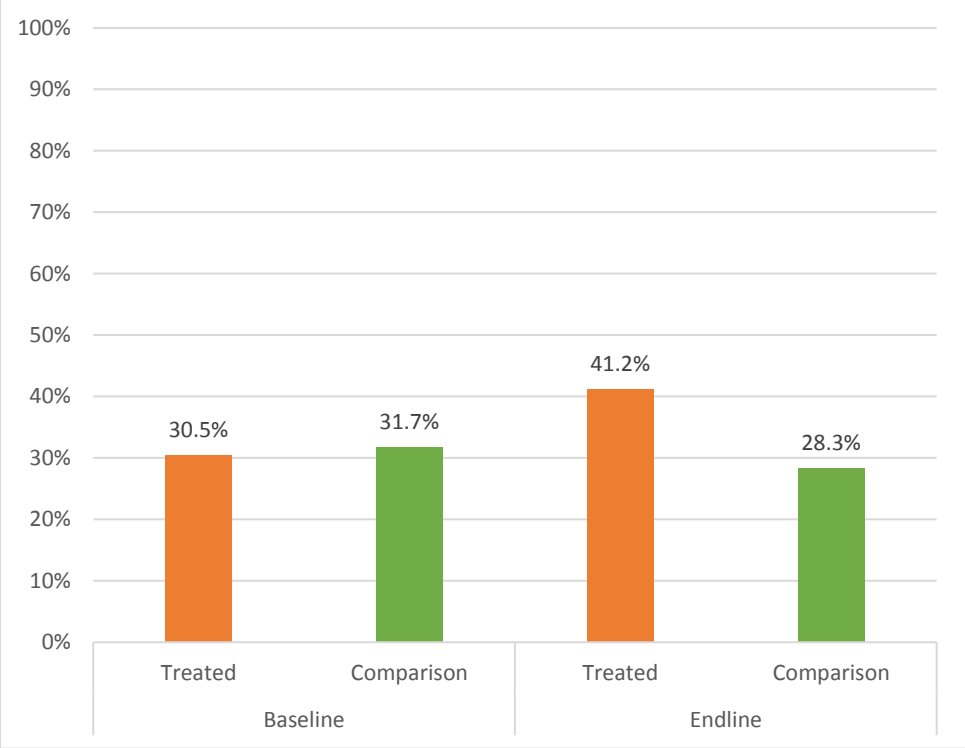

Table 1: Bivariate analyses of background characteristics by enrolment status, Ages 7-103 at endline

	Means of characteristics			P-value of difference		
	Never enrolled with NHIS	Ever enrolled but currently no valid NHIS	Currently valid NHIS	Col(1)-Col(2)	Col(1)-Col(3)	Col(2)-Col(3)
	(1)	(2)	(3)	(4)	(5)	(6)
Age	24.92	19.26	16.45	0.00	0.00	0.00
Female	0.40	0.53	0.56	0.00	0.00	0.00
Elder (Age>=70 years)	0.03	0.02	0.02	0.01	0.21	0.04
Female elder	0.02	0.01	0.01	0.15	0.74	0.19
Male elder	0.02	0.01	0.01	0.01	0.17	0.05
Household size	7.62	7.73	7.29	0.68	0.00	0.03
Educational level of head	2.40	3.81	4.31	0.00	0.14	0.00
Head no formal schooling	0.88	0.82	0.79	0.00	0.03	0.00
Head is female	0.04	0.06	0.08	0.03	0.01	0.00
Age of head	40.09	40.71	40.17	0.30	0.05	0.53
Poor	0.99	0.98	0.98	0.72	0.45	0.35
Extremely poor	0.91	0.89	0.89	0.20	0.84	0.16
Karaga district	0.40	0.21	0.12	0.00	0.01	0.00
Yendi district	0.10	0.19	0.16	0.00	0.21	0.06
Bongo district	0.07	0.12	0.19	0.00	0.00	0.00
Garu-Tempane district	0.09	0.18	0.13	0.00	0.01	0.06
N	8,378	8,035	11,695			

Mean values represent unadjusted statistics. P-values in Columns 4,5,6 correspond to the coefficient on each enrolment group from a regression predicting each characteristic listed in the table controlling for PMT score. Standard errors clustered at the community level. *** $p<0.01$, ** $p<0.05$, *** $p<0.1$

Table 2: Reasons for not renewing/never having NHIS by treatment status, Ages 7-103 at endline

	All	Comparison	Treatment	P-value of diff.
Ever enrolled but no valid NHIS	41.54	44.65	38.77	0.00
N	15,252	7,201	8,051	
Enrolment fee/premium too expensive	75.32	80.34	70.14	0.00
Did not realised card expired	11.36	10.61	12.14	0.54
Travel time/cost too high	9.28	8.40	10.19	0.37
Not aware had to be renewed annually	6.77	6.22	7.34	0.31
Has not been sick	1.59	1.49	1.70	0.68
Waiting time at renewal too long	3.05	1.15	5.00	0.00
Poor quality care with NHIS - preferred services not covered	0.32	0.19	0.45	0.18
NHIS office closed	0.44	0.19	0.70	0.19
Other (card lost, no time, etc.)	0.25	0.19	0.32	0.22
N	6,336	3,215	3,121	
Never enrolled with NHIS	18.98	22.29	16.02	0.00
N	15,252	7,201	8,051	
Enrolment fee/premium too expensive	65.44	65.28	65.64	0.92
Travel time/cost too high	14.94	17.67	11.56	0.02
Waiting time at renewal too long	4.85	4.23	5.62	0.24
Poor quality care with NHIS - preferred services not covered	3.30	2.36	4.47	0.01
Don't understand NHIS	0.28	0.19	0.39	0.39
Other	10.84	10.14	11.71	0.41
N	2,905	1,607	1,298	

P-values are reported from Wald tests on the equality of means of Treatment and Comparison for each variable. Standard errors are clustered at the community level.

Table 3: Difference-in-differences (OLS) impact estimates of Ghana LEAP 1000 on current NHIS enrolment, by age groups

	Ages 7-17 years at endline	Ages 18+ years at endline
DID (Treatment X Time)	0.14	0.15
	(0.03)***	(0.02)***
Treatment	-0.01	0.01
	(0.03)	(0.03)
Time	-0.14	-0.05
	(0.03)***	(0.02)**
Age	-0.01	-0.00
	(0.00)***	(0.00)***
Age squared	-0.00	0.00
	(0.00)**	(0.00)***
Female	0.00	0.20
	(0.01)	(0.01)***
PMT score	-0.02	0.21
	(0.18)	(0.15)
Household size	-0.00	-0.00
	(0.00)	(0.00)*
Head is female	-0.08	-0.03
	(0.03)***	(0.02)
Age of head	-0.00	0.00
	(0.00)	(0.00)***
Head no formal schooling	-0.05	-0.01
	(0.03)*	(0.02)
R^2	0.14	0.13
N	8,394	12,260
Endline comparison means	0.311	0.276

All regressions include the following covariates at baseline: Age, dummy for female (0,1), household head's age, dummy for having no formal education (0,1), dummy for women household head (0,1), PMT score, household size; community fixed effects. Impact from difference-in-difference estimates; impact on ever NHIS enrolment from single difference estimates. Analysis restricted to a panel sample. Standard errors in parenthesis clustered at the community level. * $p<0.1$ ** $p<0.05$; *** $p<0.01$.

Table 4: OLS impact estimates of Ghana LEAP 1000 on ever NHIS enrolment, by age groups (Panel)

	Individuals aged 7-17 years at endline	Ages 18+ years at endline
Treatment	0.05	0.07
	(0.03)	(0.03)**
Age	-0.01	-0.00
	(0.01)	(0.00)***
Age squared	0.00	0.00
	(0.00)	(0.00)**
Female	-0.00	0.20
	(0.01)	(0.01)***
PMT score	-0.01	0.22
	(0.16)	(0.18)
Household size	-0.00	0.00
	(0.00)	(0.00)
Head is female	-0.01	-0.06
	(0.02)	(0.02)**
Age of head	-0.00	0.00
	(0.00)	(0.00)*
Head no formal schooling	-0.03	-0.02
	(0.02)	(0.02)
R^2	0.25	0.23
N	4,192	6,130
Endline comparison means	0.832	0.746

All regressions include the following covariates at baseline: Age, dummy for female (0,1), household head's age, dummy for having no formal education (0,1), dummy for women household head (0,1), PMT score, household size; community fixed effects. Impact from single- difference estimates. Standard errors in parenthesis clustered at the community level. * $p<0.1$ ** $p<0.05$; *** $p<0.01$.

Appendices

Appendix 1: Attrition by treatment status and age group

	N	All	Comparison	Treatment	P-value of diff.
Individuals aged 5-15 years at baseline					
Attrition rate	4,736	0.11	0.12	0.11	0.75
Individuals aged 16+ at baseline					
Attrition rate	6,865	0.11	0.11	0.11	0.99

T-test based on standard errors clustered at the community level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix 2: Individual differential attrition (from baseline to endline) by baseline characteristics

	Control			Treatment			Difference		Balance	
	Attritors	Panel	P-value	Attritors	Panel	P-value	Col(1)-Col(4)	P-value	Col(2)-Col(5)	P-value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Individuals aged 5-15 years at baseline										
Background characteristics										
Age (years)	9.90	8.83	0.00	10.00	8.93	0.00	-0.52	0.43	0.01	0.97
Age squared	108.46	87.04	0.00	110.51	88.51	0.00	-10.83	0.42	-0.32	0.93
Female (0,1)	0.62	0.46	0.00	0.56	0.47	0.00	-0.03	0.73	-0.01	0.83
Household size	9.42	8.01	0.00	10.13	8.44	0.00	-0.14	0.88	0.29	0.46
Head is female (0,1)	0.07	0.06	0.58	0.04	0.07	0.01	0.00	0.99	0.05	0.04
Age of head (years)	43.66	41.76	0.08	45.47	42.69	0.02	2.10	0.43	-0.79	0.45
Head no formal schooling (0,1)	0.85	0.84	0.82	0.90	0.85	0.03	-0.07	0.26	0.03	0.49
Outcome										
Has valid NHIS insurance for current year (0,1)	0.37	0.45	0.01	0.30	0.45	0.00	0.10	0.19	0.01	0.84
N	238	1,808		301	2,389					
Individuals aged 16+ at baseline										
Background characteristics										
Age (years)	36.31	36.06	0.83	35.67	37.30	0.25	1.49	0.63	-0.11	0.87
Age squared	1,713.16	1,528.12	0.11	1,676.83	1,626.01	0.72	147.23	0.62	-11.17	0.86
Female (0,1)	0.54	0.56	0.45	0.56	0.56	0.96	0.05	0.37	0.01	0.31
Household size	8.43	6.88	0.00	9.31	7.57	0.00	0.11	0.89	0.32	0.18
Head is female (0,1)	0.08	0.05	0.13	0.07	0.07	0.74	-0.01	0.77	0.04	0.04
Age of head (years)	42.77	38.50	0.00	44.95	41.12	0.00	-3.71	0.16	0.32	0.75
Head no formal schooling (0,1)	0.75	0.78	0.38	0.81	0.82	0.78	-0.13	0.11	0.05	0.19
Outcome										
Has valid NHIS insurance for current year (0,1)	0.26	0.33	0.02	0.21	0.32	0.00	0.05	0.46	0.03	0.26
N	359	2,996		376	3,134					

Mean values represent unadjusted statistics. P-values in Column 8 are from the coefficient on treatment from a regression predicting each characteristic listed in the table controlling for PMT score, among the group of attritors, while Column 10 is the same among the panel sample. Standard errors clustered at the community level.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$