



IMPROVING HEALTH SERVICE DELIVERY THROUGH
COMMUNITY MONITORING AND NON-FINANCIAL
AWARDS: REPORT TO USAID

January 2015



THE WORLD BANK

Acknowledgements

The interventions being evaluated have been developed in partnership with the Government of Sierra Leone's Decentralization Secretariat (DecSec) and have been funded by the World Bank's Decentralized Service Delivery Program (DSDP) and Institutional Reform and Capacity Building Program (IRCBP). The interventions are being implemented by three non-governmental organizations: the International Rescue Committee, Concern Worldwide, and Plan International.

Data collection, staffing, clinic mapping, piloting activities and other operating costs related to the impact evaluation were funded by the International Growth Centre (IGC), Namati, the World Bank, and the United States Agency for International Development (USAID). Innovations for Poverty Action (IPA) and the Centre for the Study of African Economics (CSAE) at Oxford provided logistical support, and managed the development of survey instruments, data collection, and analysis.

This report was written by IPA, with technical oversight from Oeindrila Dube (New York University), Johannes Haushofer (MIT-JPAL) and Bilal Siddiqi (Oxford University). Gieltje Adriaans, Ali Ahmed, Alix Bonargent, Fatu Conteh, Sarah Dykstra, Caroline Fry, Niklas Heusch, Anthony Mansaray, and Samantha Zaldivar-Chimal provided excellent research assistance, and Mike Duthie, Joshua McCann, Andrew Tedesco, and Abebual Zerihun provided in-country supervision.

Contents

Acknowledgements	1
List of figures	3
Abbreviations	4
1 Introduction	5
2 Program and evaluation overview	6
2.1 The health sector in Sierra Leone	6
2.2 Incentivizing health service delivery: a review of the evidence	6
2.3 Social accountability interventions	8
2.4 Evaluation design	9
2.5 Data collection	9
3 Results	11
3.1 Key outcomes	11
3.2 Overview of the main results	11
3.3 Utilization	12
3.4 Immunization	14
3.5 Institutional deliveries	16
3.6 Antenatal care visits	18
3.7 Illegal fees	18
3.8 Nurse absenteeism	19
3.9 Staff attitude	21
3.10 Anthropometric outcomes	21
3.11 Maternal and under-five mortality	25
4 Cost-effectiveness analysis	27
5 Outreach	30
5.1 Partners	30
6 Conclusion	32
References	33

List of Figures

1	Time trend. % of households that had visited the target clinic in the previous month	13
2	Treatment effects. % of households that had visited the target clinic in the previous month	14
3	Time trend. Average vaccination scores	15
4	Time trend. Proportion of households delivering in government clinics . .	17
5	Treatment effects. Proportion of households delivering in government clinics	17
6	Time trend. Proportion of households paying an illegal fee at least once .	20
7	Treatment effects. Proportion of households paying an illegal fee at least once	20
8	Time trend. Proportion of households experiencing absenteeism at least once	22
9	Treatment effects. Proportion of households experiencing absenteeism at least once	22
10	Time trend. Average attitude score	23
11	Treatment effects. Current nutritional status: % of children wasted	25
12	Time trend. % of households experiencing the death of an under-five child	26
13	Time trend. % of households experiencing the death of a mother during childbirth	27

Abbreviations

ANC	Antenatal Care
CM	Community Monitoring
CSAE	Centre for the Study of African Economics
DecSec	Decentralization Secretariat
DSDP	Decentralized Service Delivery Program
GIS	Geographic Information Systems
GoSL	Government of Sierra Leone
IGC	International Growth Centre
IPA	Innovations for Poverty Action
IRCBP	Institutional Reform and Capacity Building Program
MoHS	Ministry of Health and Sanitation
NFA	Non-Financial Award
NPS	National Public Services survey
OLS	Ordinary Least Squares
PNC	Postnatal Care
SLDHS	Sierra Leone Demographic and Health Survey
USAID	United States Agency for International Development

1 Introduction

Over the past decade, the Government of Sierra Leone (GoSL) has made a concerted effort to improve health care services throughout the country, including an ambitious free health care initiative launched in 2010. Key to the success of the initiative was strengthening the weak incentives faced by frontline health providers—for example, in early 2010, a large share of health staff were compensated entirely through informal fee payments from users and margins from drug sales. To alleviate basic resource constraints, the GoSL increased worker salaries and the flow of resources to clinics nationwide, and sought to introduce non-financial incentive schemes, which recent studies have shown to be highly effective in improving worker performance in a range of environments (Björkman & Svensson, 2009, Kosfeld & Neckermann, 2011, Ashraf, N. et al., 2011). However, could such schemes be applied to Sierra Leone’s health sector, and if so, what types of non-financial incentives would work best?

To answer this question, the GoSL, in conjunction with the World Bank, the Centre for the Study of African Economies, and Innovations for Poverty Action, launched a randomized controlled trial to test the effectiveness of two innovative interventions using non-financial incentives to improve health care outcomes. The first intervention involved community monitoring of health clinics through the use of health scorecards and collaborative meetings between community members and health staff. The second intervention used non-financial awards, such as public commendations, with the aim of improving worker motivation and promoting greater efficiency within health clinics. This report outlines findings on key indicators of the randomized evaluation.

Since the beginning of 2014, Sierra Leone has been facing an unprecedented Ebola outbreak that revealed the limitations of the health care system and has already deeply affected the public health sector. The outbreak notably highlights a chronic lack of trust in the health authorities and more broadly in the public sector. In this respect, initiatives aiming at reinforcing accountability at the local level and improving relationship between the community and health care providers are likely to play a central role in the rebuilding of the health care system in the post-Ebola landscape.

2 Program and evaluation overview

2.1 The health sector in Sierra Leone

Sierra Leone ranks close to last in the UN's Human Development Index and faces some of the lowest health indicators in the world. The health system is plagued by chronic worker absenteeism, low utilization of health clinics for essential services such as assisted deliveries¹, and under-provision of critical basic health care such as vaccinations of children under five². This poor service delivery is in part due to unrealistically weak incentives for service providers, which do not align the interests of public health staff with the interests of local communities. Often, public health staff work on a voluntary basis, or are compensated at very low levels, and use margins from drug sales and in-kind community contributions to supplement their income (according to MoHS). In addition, many clinics do not receive operating budgets and finance investments such as facility repairs out of drug profit margins and by charging informal user fees, even to women and children under five, who are supposed to receive free health services by law.

Over the past decade, the GoSL has made a concerted effort to improve health care services within the country. Alongside a national decentralization program introduced in 2004, the Government of Sierra Leone launched an ambitious policy in 2010 to institute free healthcare for pregnant women, new mothers and children under-five. The policy abolished user fees, while at the same time raising workers' salaries. The reforms were introduced along with programs - performance-based financing and interventions relying on non-financial incentives - aiming at improving oversight of health workers and changing underlying incentive systems in order to address the challenges faced by the public health sector (illegal fee-charging, nurse absenteeism and poor health outcomes).

2.2 Incentivizing health service delivery: a review of the evidence

Recent experiments have highlighted the power of non-financial incentives to improve the performance of individuals performing public service. Such mechanisms utilize the power of social sanctions and rewards, through mechanisms such as public recognition and community monitoring, and are attractive for three reasons. First, they are cost-effective: both theory and empirical evidence suggest that the likely channels through which these interventions operate are concerns for status and reputation (Tirole, 1996; Besley and Ghatak, 2008; Frey and Neckermann, 2010; Banerjee et al., 2004; Yared, 2009), and it has been shown that such concerns drive behavior even in the absence of material benefits (Kosfeld and Neckermann, 2011). Thus, the deeply rooted human desire

¹Results from the 2011 Integrated National Public Service Survey and the 2008 Demographic and Health Survey

²The 2008 Sierra Leonean Demographic and Health Survey reveals very low level of vaccination coverage among children under five years of age. However, preliminary results from the 2013 Demographic and Health Survey suggest that immunization has substantially improved over recent years.

for recognition can act as a free-of-charge incentive that can replace financial incentives. Second, non-financial awards avoid the potential crowding-out effect that performance-based payment schemes can have on intrinsic motivation (Bénabou and Tirole, 2003; Camerer and Hogarth, 1999; Kreps, 1997). This concern carries weight because intrinsic motivation has been shown to be a major component in the job motivation of health workers in developing countries (Mathauer and Imhoff, 2006; Stilwell, 2001). Finally, non-financial incentives also obviate the significant monitoring and other administrative costs that are incurred by performance-based incentive schemes, and can operate even in the presence of limited liability and moral hazard (Kohn, 1999; Besley and Ghatak, 2008).

In the area of public recognition, Ashraf et al. (2011) find that social recognition was a more powerful performance motivator and more cost-effective than both financial compensation and voluntary contracts. Moldovanu et al. (2007) provide a simple theoretical framework showing that under simple assumptions (awards increase the utility of the recipients, and decrease that of non-recipients; and the utility of receiving the award decreases in the number of workers who receive it), awards should increase the effort provided by workers. In line with this prediction, Kosfeld & Neckermann (2011) show in a randomized field experiment that purely symbolic awards boost the productivity of students by 12%. Since material benefits from the awards were ruled out, this study also showed that the performance improvement was driven by social recognition and status alone. Similarly, Markham et al. (2002) showed that a public recognition program in a U.S. manufacturing firm substantially improved employee attendance.

In the area of community monitoring, Björkman and Svensson (2009) and Björkman-Nyqvist, de Walque and Svensson (2014) observe remarkable improvements on a vector of health outcomes from training communities to effectively monitor their health providers in Uganda, in both the short and long run. Similarly, Duflo et al. (2012) find that training PTA committees in India to effectively monitor schools reduced teachers' absenteeism and increased student test scores.

However, the finding that such non-financial incentives work leaves a crucial question unanswered: did community monitoring improve clinic performance because it was a 'bottom-up' intervention which made clinic personnel socially accountable to their immediate neighbors? Or did it work because clinic performance was being evaluated *per se*, without it being necessary that this evaluation was performed within the community? Put differently, might the incentives as well have been 'top-down' rather than bottom-up? The answer to this question is important because top-down incentives are potentially much cheaper and more efficient than bottom-up incentives. Furthermore, one of the few studies that compares top-down to bottom-up monitoring (Olken, 2007) in the context of road provision in Indonesia, finds evidence in favor of top-down audits of public works. Yet there is little data about whether the same conclusions would hold in resource-poor environments such as Sierra Leone, where top-down monitoring capacity is limited.

2.3 Social accountability interventions

In 2011, the GoSL requested support under the World Bank’s Decentralized Services Delivery Project (DSDP) for social accountability activities designed to monitor performance and motivate workers within the free health care initiative. As part of this effort, the GoSL partnered with Centre for the Study of African Economies (CSAE), Innovations for Poverty Action (IPA), and researchers from Oxford, NYU and JPAL to conduct a rigorous, scientific investigation of two innovative social accountability interventions designed to incentivize health workers, stimulate demand for health services, and strengthen the link between providers and communities. The interventions were designed and implemented by the GoSL’s Decentralization Secretariat (DecSec) along with three international NGOs—the International Rescue Committee, Concern Worldwide and Plan International. The MoHS has remained a partner throughout.

The first intervention, involving non-financial awards, facilitates yardstick competition among groups of maternal and child health clinics, and rewards workers at both the best performing and the most improved facilities. At baseline, a relative ranking of clinics by district on key measures of performance, such as worker absenteeism, staff attitude and charging of illegal fees, and utilization for maternal and child health services was calculated. The competition, entitled “Respect Pass Money”, was advertised through district-wide clinic meetings, posters on clinics and through individual meetings at clinics held by trained facilitators from partnering NGOs. Facilitators discussed clinic performance and the competition with clinic staff; however, the indicators used to produce clinic rankings were not revealed to clinics or the public, in order to prevent ‘teaching to the test.’ Clinics were revisited three times throughout the course of the 9-month competition in order to sustain interest and at the end of the nine months, an audit of reported clinic results was conducted, and any clinic found to be misrepresenting information were disqualified. At endline, those clinics (i) which performed best in absolute terms on these indicators, and (ii) which showed the greatest improvement over the course of the intervention, were declared winners and received non-financial awards. Specifically, staff at winning clinics received certificate of commendation and a wall clock for the clinic from high-ranking politicians at a public ceremony.

The second intervention builds upon evidence from the recent community monitoring initiative in Uganda. A ‘bottom-up’ community monitoring intervention introduced health scorecards that provide information regarding the state of health care in each community, and facilitated interface meetings between community members and health facility staff. Prior to the meetings, communities were surveyed on their perception of service provision by the local clinic, and focus groups held to discuss the state of health care in the community. During the interface meetings, information about the state of health care was disseminated via a community scorecard and mutual commitments made to improve services through a joint action plan addressing such areas as staff absenteeism, maternal mortality and vaccination rates. Additional meetings were held one month, three months and nine months after the initial meeting to review the joint action plan

and progress made since the previous meeting. This framework aimed to ensure participatory decision-making and hold both health care workers and the community mutually accountable, fostering increased access to and utilization of maternal and child health services.

2.4 Evaluation design

The evaluation employed a randomized, controlled field experiment to assess the causal impact of the interventions. Clinics and their catchment area were randomly selected to participate in one of the interventions (they constitute the “treatment group”) or to act as control. This methodology ensures that observed and unobserved characteristics likely to affect health outcomes and clinics effectiveness are similarly distributed across treatment and control groups before the intervention. Consequently, any difference in indicators of interest between treatment and control groups observed after the intervention can be interpreted as the effect of the intervention itself.

Two hundred and fifty-four health clinics in 4 districts of Sierra Leone were selected to participate in the evaluation. The districts of Bo, Bombali, Kenema and Tonkolili were selected to provide regional balance. Prior to selection, a mapping exercise of 330 clinics and their catchments was undertaken in order to select clinics based on the least amount of overlap between catchment populations and minimize the possibility of spillovers between treatment and control clinics. The starting point was conducting GPS coding to track and establish the physical location of maternal and child clinics. This involved mapping the list of villages in each facility’s catchment area and integrating it with existing Geographic Information Systems (GIS) data for Sierra Leone, so that the location and population of each facility’s designated catchment area could be established. Eleven clinics were dropped due to the fact that their locations could not be verified. The remaining 319 clinics were narrowed down to 254 clinics after eliminating clinics based on distance criteria to minimize spillovers.

Using a non-bipartite matching algorithm created specifically for this project, the clinics within the sample were split into triplets based on similar utilization and performance characteristics gathered during baseline data collection. Clinics were then randomly assigned within these triplets to participate in either the community monitoring intervention, the non-financial awards intervention or act as a control, so that each group comprise a third of the clinics. In total, the sample consisted of 254 MCHP and CHP health clinics, 508 communities (two villages are selected in each clinic’s catchment) and 10 households per community, or 5080 households in total.

2.5 Data collection

Baseline data collection was performed in September 2011. The endline surveys were conducted in May and June of 2013.

Four types of survey were administered – a clinic survey, community survey, household survey and user-feedback survey. The surveys were conducted as follows:

1. Clinic Survey - All clinics participating in the evaluation were surveyed to assess clinic services, resources and staffing, and underwent an audit of drug stocks and registers.
2. Community Survey - A community survey was administered to leaders in each of the 508 target villages. The questionnaire inquired into their communities' remoteness, public health status and any on-going government and NGO projects.
3. Household Survey - All the households surveyed in the National Public Services survey (NPS) 2008 (five per community) were included in the sample.
4. User-Feedback Survey - Fifteen randomly sampled individuals in two villages (within 2 miles of the clinic) were administered a user-feedback questionnaire to collect information on recent health episodes, and feedback on service provision and satisfaction

The four surveys were piloted in June 2011 in three districts that were not selected for the intervention - Western Rural, Pujehun, and Port Loko. The pilot study helped to address issues with the structure and content of the surveys as well as the audit verification which was planned to verify the information provided by the clinic. For the collection of endline data, the household survey and user-feedback survey were combined. The research team ensured a high level of data quality by closely monitoring the data while surveys were taking place. Extensive back-checking was performed and the incoming data was examined on a regular basis for measurement error. Supervisors and monitors provided feedback to enumerators and in-field refresher trainings were conducted as necessary. Range and internal consistency checks were completed to yield a clean dataset.

3 Results

3.1 Key outcomes

The effectiveness of the interventions was assessed through indicators of maternal and child health outcomes, clinic utilization, and the quality of services provided. More precisely, eight key outcomes were specified: number of children completing first year of required vaccinations, number of institutional deliveries, number of women completing fourth antenatal care visit, whether fees are charged for maternal and under-five health services, nurse absenteeism, staff attitude, number of maternal deaths, and number of under-five deaths. Furthermore, the effects of the interventions on clinic utilization and the nutritional status of under-five children were evaluated.

The analysis that follows focuses on these indicators. The first six indicators and clinic utilization describe the quality and quantity of health care services; mortality and nutritional outcomes refer to health outcomes directly. We run Ordinary Least Squares (OLS) regressions at the household level in which the endline outcomes are compared across the different groups (Control, Community Monitoring and Non-Financial Awards). The analysis presented here utilizes data from the endline household survey and not the clinic and baseline survey; as such, all results are based on cross-sectional regression analyses.³ The analyses of mortality and utilization are exceptions in this regard: repeat cross-sectional regressions, including both baseline and endline data, were used as the sample was slightly unbalanced at baseline. For all other outcomes presented in the report, the sample was balanced at baseline.

3.2 Overview of the main results

Community Monitoring has promising effects on the quality of health services delivered by the target clinics. The findings indicate that the intervention increased utilization by the households of the catchment area and the proportion of pregnant women giving birth in government clinics, reduced the prevalence of illegal fee charging and improved the nutritional status of children under five (in the short run). As expected, there was no impact observed on health outcomes varying in the longer run, such as stunting or mortality. The Non-Financial Award intervention does not appear to have substantially affected service provision and health outcomes.

The table below summarizes the results of the randomized evaluation. Each result is discussed in further details below.

³Only half of the households included in the baseline sample - or 5080 households - were selected to participate to the endline survey. Among those selected households, 87 % (4437 households) were located by the survey teams and reinterviewed. When a household could not be found by the surveyors, it was replaced by another household from the baseline sample which was not initially selected to be reinterviewed. These replacement households were not taken into account in the following analysis.

Table 1: Overview. Treatment effects of the CM and NFA interventions

Outcome	Community Monitoring	Non-Financial Awards
Utilization	Households 11% more likely to have utilized the target clinic in the previous month.	No change
Immunization*	No change	No change
Institutional deliveries*	Households 10% more likely to deliver in government clinics.	No change
Antenatal care visits*	No change	No change
Illegal fees*	Households 27% less likely to have paid an illegal fee.	No change
Nurse absenteeism*	No change	Households are 69% more likely to have encountered nurse absenteeism.
Staff attitude*	No change	No change
Wasting	Proportion of wasted children is 44% lower, at 4.2% (compared to 7.5 percent).	No change
Stunting	No change	No change
Mortality*	No change	No change

* included in the eight core indicators

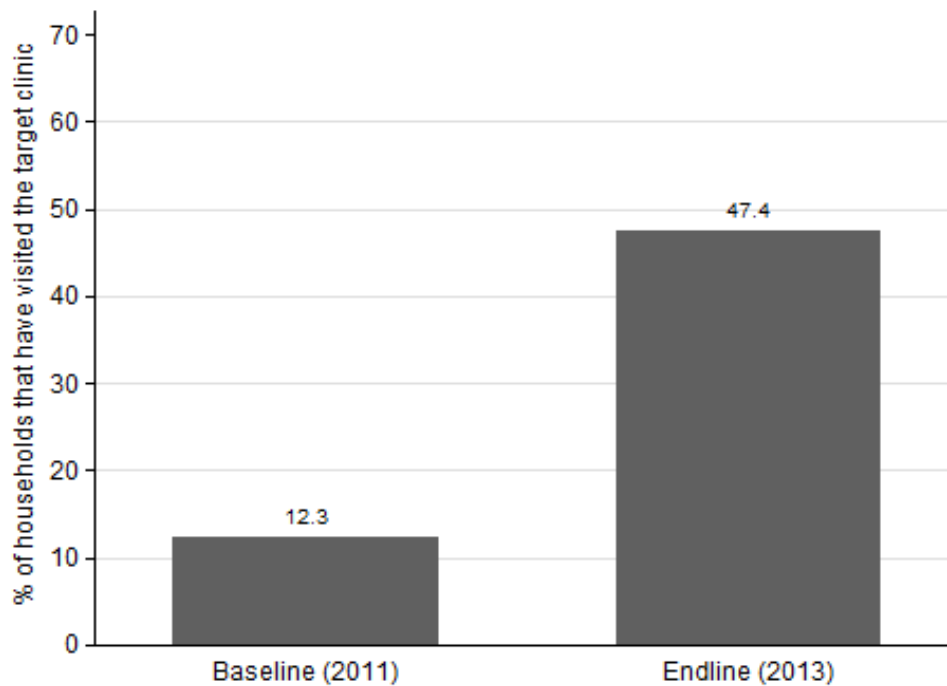
3.3 Utilization

Summary: The period 2011-2013 saw a rapid rise in clinic utilization across all treatment groups. In addition, the community monitoring intervention had a significant positive impact on clinic utilization, with households being 11% more likely to have utilized the target clinic in the previous month.

Ensuring that adequate care is sought from a skilled provider whenever medically necessary is a crucial first step for improving health outcomes. Reduced absenteeism, fewer illegal fees, and a good attitude of clinic staff, all outcomes which the interventions aimed to obtain, are likely to affect the utilization of clinics. Clinic utilization is hence a natural starting point for assessing the interventions.

Data on clinic utilization and care-seeking behavior is recorded in the household surveys. Apart from vaccinations, antenatal care, and births, the surveys recorded for each episode of illness and injury whether and where the affected household member obtained medical care. From this information a dichotomous variable, equal to 1 if any household member utilized the target clinic, was calculated. The effect of the interventions on this outcome allows to draw inferences on the utilization of target clinics and the quantity of care obtained. To analyze whether the interventions caused patients to simply take their business to the target clinic (i.e. to utilize the target clinic instead of other clinics) or to obtain a greater quantity of care from clinics in total (i.e. to utilize the target clinic when they would not have utilized any clinic otherwise), both outcomes are also generated for the utilization of government clinics (which include target clinics) and the utilization of any type of clinic (which includes government clinics).

Figure 1: Time trend. % of households that had visited the target clinic in the previous month



Time trends figures display the change in outcome mean - here the difference in the proportion of households having visited the target clinic in the past month - overtime in the control group.

Figure 1 shows the time trend in target clinic utilization between 2011 and 2013. Target clinic utilization increased dramatically: while in 2011 only 12.3% of households had visited a target clinic in the previous month, 47.4% of households in the control group had done so in 2013. This increase is likely to be driven by Sierra Leone's provision of free health care for under-five children and pregnant and lactating mothers. The overall

utilization of government clinics (which includes target clinics) increased similarly. These findings suggests that the increase in target and government clinic utilization is driven by a higher clinic utilization overall: in 2013, households visited a clinic when they would not have done so in 2011. However, this does not exclude the possibility of substitution towards target clinics among treatment households.

Figure 2: Treatment effects. % of households that had visited the target clinic in the previous month

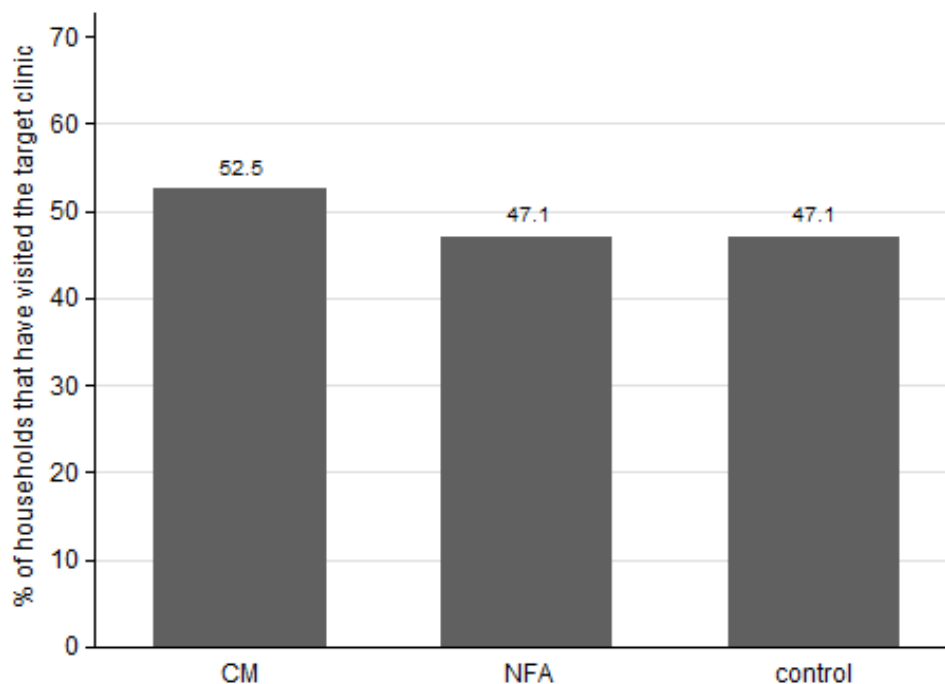


Figure 2 shows the effects of the interventions on clinic utilization at endline. Community monitoring lead to a statistically significant 5.4 percentage-point increase in the number of households that had visited the target clinic in the past month compared to the control group. The NFA intervention did not lead to a significant increase in target clinic utilization compared to the control mean of 47.1%.

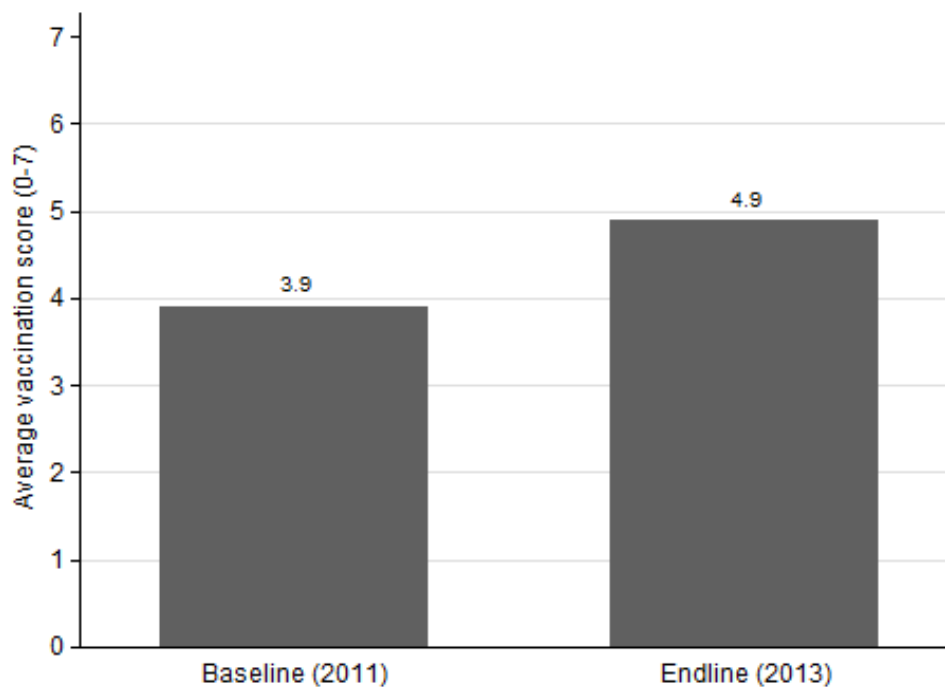
3.4 Immunization

Average vaccination scores increased between 2011 and 2013. Neither intervention affected child immunization.

According to information collected in the Sierra Leone Demographic and Health Survey

(SLDHS), only 68% of children aged 12 to 23 months were fully vaccinated⁴ in 2013. Vaccination coverage for the first dose of vaccine is always above 95% of children for BCG, DPT and Polio but the figures start declining with the subsequent doses (to around 78% for the third doses of DTP and Polio). Thus, the challenge in reaching full vaccination lies in ensuring that all children receive the complete immunization cycle for each type of vaccine.

Figure 3: Time trend. Average vaccination scores



In the household questionnaire, information on vaccination history is collected for each under two child living in the household. The date of each vaccination received is taken from the child's Growth Monitoring Card⁵ for 7 different vaccines: BCG, Polio, Pentavalent (diphtheria, tetanus, whooping cough, hepatitis B and *Haemophilus influenzae* type b), Pneumococcal (PCV), Rotavirus (RVV), Measles and Yellow Fever. A variety of household level indicators are computed from the vaccination information collected at the individual level. The results here presented are the average vaccination scores (on a scale from 0-7) for children aged 12 to 23 months. The vaccination score counts the

⁴The World Health Organization guidelines, a child is fully vaccinated when (s)he has received a vaccination against tuberculosis (BCG), three doses each of diphtheria, pertussis, and tetanus (DPT) and polio vaccines, and a measles vaccination by the age of 12 months.

⁵70% of children aged 9-23 months had a Growth Monitoring Card, which surveyors asked to see; there was no difference between control and treatment groups in the percentage of children that had a Growth Monitoring Card.

number of vaccinations for which a child has received all required doses. Hence, a child with a score of 7 has received all doses of all recommended vaccinations, whereas a child with a score of 4 has only received all required doses for four (out of seven) recommended vaccinations.

Average vaccination scores increased between 2011 and 2013, as Figure 3 shows. While in 2011, children aged 12 to 23 months had on average completed the vaccination schedule for 3.9 vaccines, children in the same age range in the control group had completed the schedule for 4.9 vaccines in 2013. However, neither intervention produced an additional impact on vaccination scores or other measures of vaccination status. At endline, there was no significant difference in outcomes between the control and the treatment groups.

3.5 Institutional deliveries

Institutional deliveries increased by 10% between 2011 and 2013. Additionally, households in community monitoring villages were 10% more likely to deliver in government clinics.

According to the 2013 SLDHS, 54% of childbirths occur in a health facility and 60% are performed by a skilled providers (doctor, nurse, midwife or MCH aide). Provision of safe delivery services is an essential condition to improve maternal and infant health and especially to reduce maternal mortality at childbirth.

Each woman in the household who gave birth in the past year was administered a survey module on childbirth, covering assistance received during labor and the final place of delivery. The vast majority of households experienced only one childbirth in the past year. A dichotomous variable, equal to 1 if the birth took place at a government clinic and equal to 0 if the birth took place elsewhere, was hence calculated for each household. For households experiencing more than one birth, the variable was set equal to 1 if at least one birth took place at a government clinic.

Figure 4 shows a clear upward trend in the proportion of households delivering at government clinics between 2011 and 2013. While in 2011 70.5% of births took place in government clinics, this figure increased to 80.4% in the control group in 2013.

The Community Monitoring intervention produced an additional and significant increase in the proportion of deliveries occurring in government clinics, as Figure 4 displays: households in CM villages are an additional 8 percentage-points more likely to deliver in a government clinics. This corresponds to a 10% increase in the likelihood of giving birth in a government clinic as a result of the CM intervention. In contrast, the NFA intervention does not lead to a significant increase in the proportion of deliveries in government clinics.

Figure 4: Time trend. Proportion of households delivering in government clinics

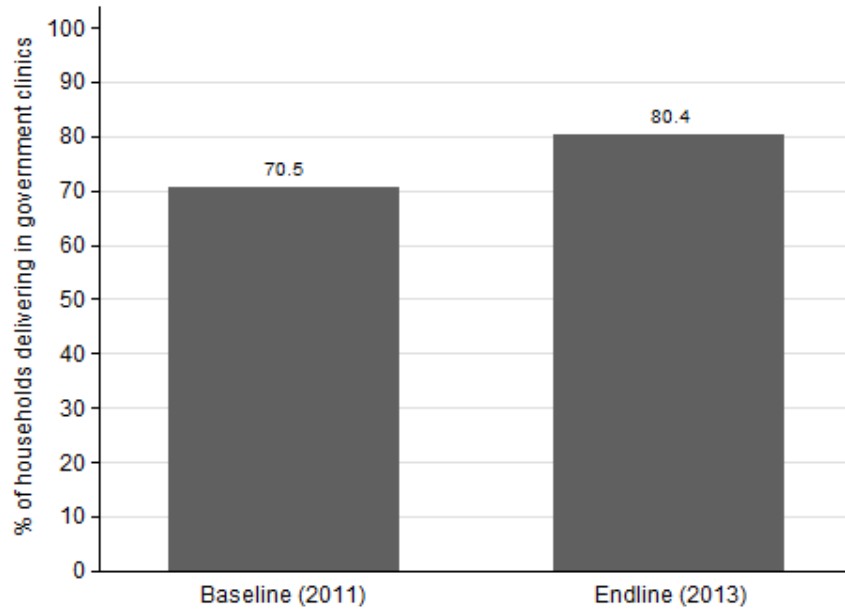
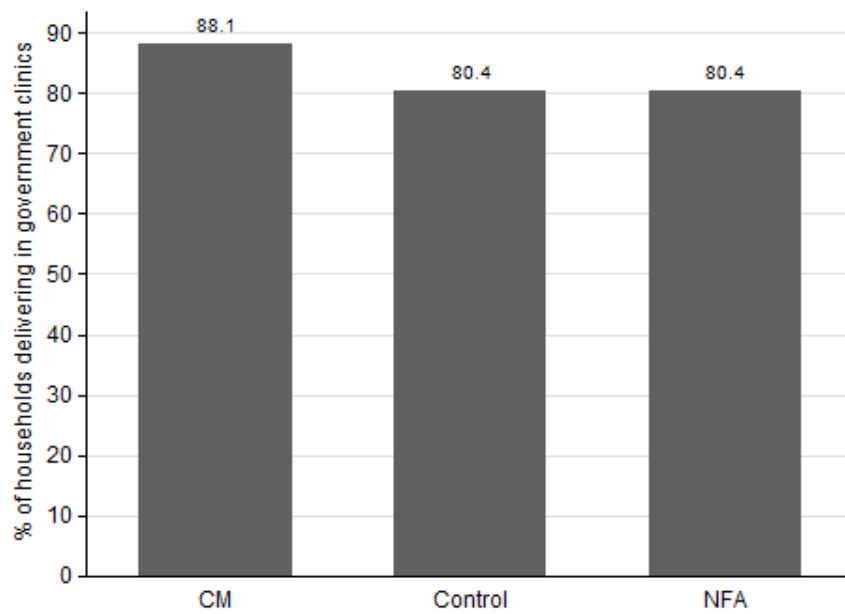


Figure 5: Treatment effects. Proportion of households delivering in government clinics



3.6 Antenatal care visits

Neither intervention affected antenatal care.

Another key determinant of maternal health and infant development is access to adequate antenatal care (ANC). ANC aims to provide the necessary information to prepare future mothers for pregnancy, birth and parenthood, and aims to help prevent and treat problems encountered during the pregnancy. Consequently, monitoring the frequency, the regularity, and the timing of the visits is extremely important. As an illustration, deliveries at a health facility are common for women having received ANC, especially for women having completed four or more ANC visits.

Women who received antenatal in the past month were asked detailed questions about the location and the type of health facility attended, the number of visits for ANC in the past month and the date of the last consultation. This information allows to identify the women having completed three and four ANC visits among all pregnant women having completed at least one ANC in the past month.

At baseline, 22% of the 85 women in the relevant sample had completed at least three ANC visits; at endline this proportion was slightly higher at 27% in the control group, but the difference was not statistically significant. Of the 85 women at baseline, 12% had completed four ANC visits, while 21% of the 78 women in the control group at endline sample had done so. This difference is also not statistically significant.

Neither intervention had an impact on the proportion of women completing at least three ANC visits. This finding is robust - when considering the proportion of women having completed all four ANC visits, neither intervention produced a significant increase. However, one must keep in mind that this apparent absence of results could potentially be driven by the limited sample size for this indicator.

3.7 Illegal fees

Illegal fee payments increased slightly between 2011 to 2013, by about 3%. However, households in community monitoring villages were 27% less likely to have paid an illegal fee.

Among the factors impeding access to health care services, the cost of treatment is the first reason cited by Sierra Leonean women. Up to 80% of women report that paying for treatment was the main obstacle preventing them from seeking treatment. In addition, charging of illegal fees by health workers can weigh on already strained relationship between the community and the formal health system. The Free Health Care Initiative was aimed precisely at eliminating fees for maternal and under-5 care, and we are able to measure if the interventions influence illegal fees levied for these types of care. Payment of illegal fees

In the module specific to target clinic attendance in the household questionnaire, information regarding fees and in-kind payments was collected for each household member for each type of episode. The Free Health Care Initiative provides virtually all treatment free of charge for lactating and pregnant women and children under five. For the purpose of this research, the payment of illegal fees is therefore defined as any payment, either in cash or in-kind, given during a visit to the target clinic for childbirth, child vaccination, antenatal and postnatal care (ANC/PNC), or treatment for illness/injury of an under-5 child. At the household level, a dichotomous variable indicating if any household member paid illegal fees in the past month is hence calculated.

In 2011, 22.9% of households paid at least once in the previous month an illegal fee for a supposedly free visit; in 2013, 26.6% of households in the control group did so.

The Community Monitoring intervention had significant success in reducing the solicitation of illegal fees, as Figure 7 shows. The proportion of visits in which an illegal fee was solicited was 7.3 percentage-points lower, translating into a large 27% reduction in the likelihood of households having to pay an illegal fee. In contrast, the NFA intervention did not produce a significant change in the likelihood of having to pay an illegal fee. In parallel, the control group experienced a slight upward trend between 2011 and 2013 in the proportion of households experiencing illegal fees (Figure 6).

3.8 Nurse absenteeism

Absenteeism more than halved between 2011 and 2013. Households in NFA villages were 71% more likely (although from a low base probability) to have encountered nurse absenteeism.

The availability of health care providers at the facility is another essential determinant of access to health care. Over a third of women interviewed in the SLDHS declare that staff absenteeism is a serious problem in getting treatment.

The measure of absenteeism was derived from the information collected in the target clinic specific module. It is a dichotomous variable indicating if any household members experienced nurse absenteeism - i.e., came to the target clinic during regular hours and found no staff present at least once - in the past month. It is possible that both interventions may have increased clinic utilization. Since the probability of facing nurse absenteeism could be positively correlated with clinic visits, it is important to account for the number of visits to the target clinic. Regressions controlling for the number of clinic visits were hence run as robustness checks; and yielded similar results.

Figure 8 shows the time trend in the proportion of households experiencing absenteeism at least once between 2011 and 2013. The figures suggest that absenteeism more than halved between 2011 and 2013.

Figure 9 examines the impact of the two interventions on nurse absenteeism. 2234 households reported at least one visit of a household member to the target clinic in the

Figure 6: Time trend. Proportion of households paying an illegal fee at least once

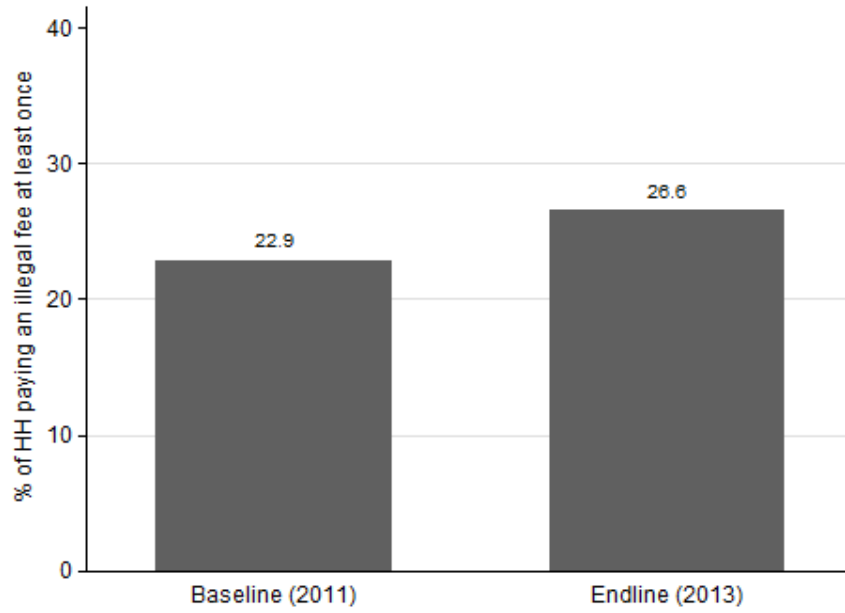
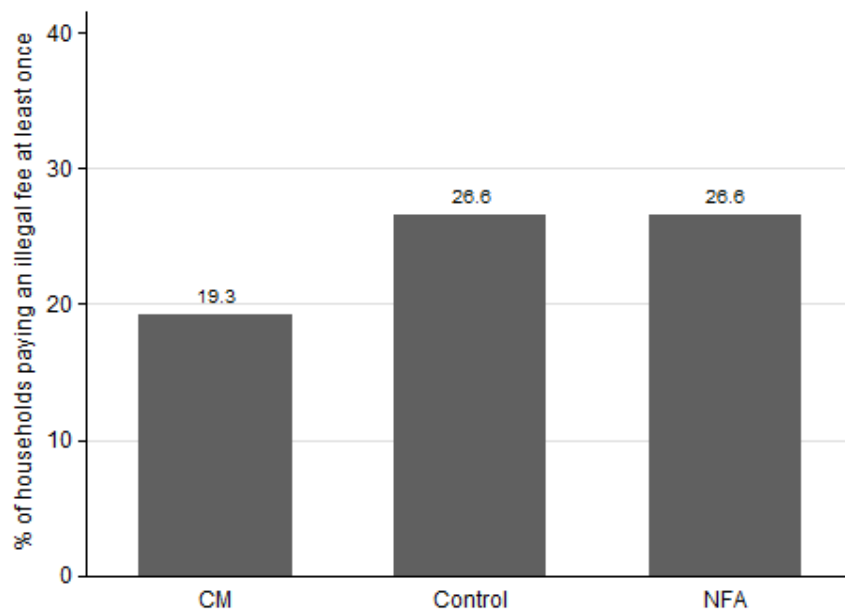


Figure 7: Treatment effects. Proportion of households paying an illegal fee at least once



past month. Only 5.8% of households in the control group ever found a nurse absent in regular opening hours during any such visits of members. However, households in the NFA group were a significant 4.1 percentage-points more likely (a 71% increase over the control group, albeit from a low base) to have encountered nurse absenteeism at least once during visits to the target clinic in the past month. This result is surprising and needs further explanation. One possibility is that nurses increased the number of visits to households in an effort to improve their clinic's ranking and, as a result, ended up being less present to the clinic. Another possibility is that learning about their rankings demotivated poorly performing nurses even further, and had no effect on higher performing nurses.

In contrast to the NFA intervention, the CM intervention did not have a significant impact on nurse absenteeism.

3.9 Staff attitude

Staff attitude was positively viewed by patients in both 2011 and 2013. Neither intervention affected perception of staff attitude.

Medical problems involving women and children often touch on sensitive issues. As such, staff attitude may play a significant role in determining whether or not patients feel comfortable enough to bring their medical issues to public health clinics. This in turn, will affect the level of health services patients receive.

For each type of health episode, individuals who attended the target clinic in the past month were asked to rank the attitude of the staff on a four-level Likert scale (ranging from 'very polite and respectful' to 'very rude and disrespectful'). An individual attitude score was then computed by averaging the episode specific scores. At the household level, the final outcome used is the average attitude score among household members having attended the target clinic in the past month (see Figure 10). This average attitude score ranges from 1 to 4, with a score close to 1 indicating a good performance for the staff of the clinic.

Reported average satisfaction did not differ significantly between 2011 and 2013, or between the treatment and control groups in 2013. Similarly, Figure 10 displays the time trend of the average reported satisfaction with staff attitude between 2011 and 2013. Overall, households were very satisfied with the attitude of clinic staff, as the average score of 1.3 suggests.

3.10 Anthropometric outcomes

The community monitoring intervention had a significant positive impact on the current nutritional status of under-5 children. The proportion of children considered wasted is 44% lower in CM villages, at 4.2% (compared to 7.5 percent).

Figure 8: Time trend. Proportion of households experiencing absenteeism at least once

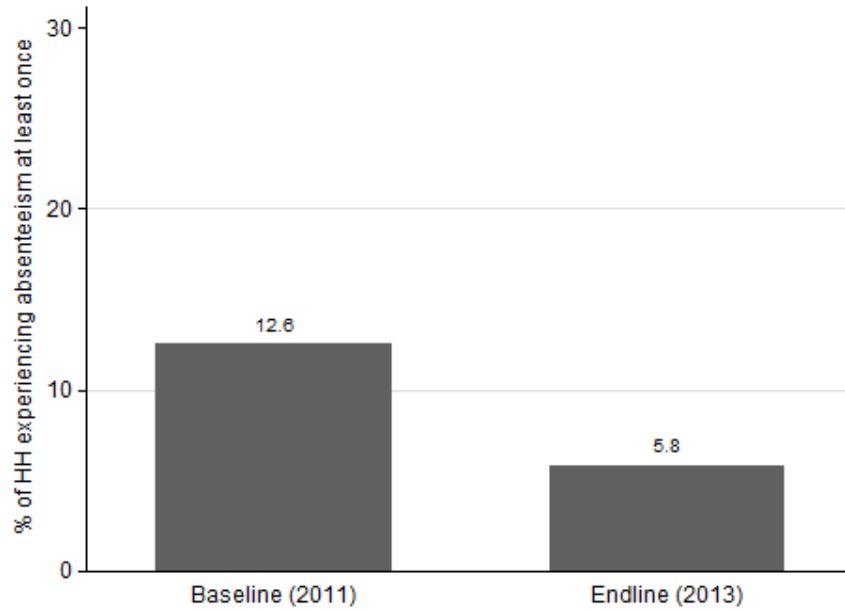


Figure 9: Treatment effects. Proportion of households experiencing absenteeism at least once

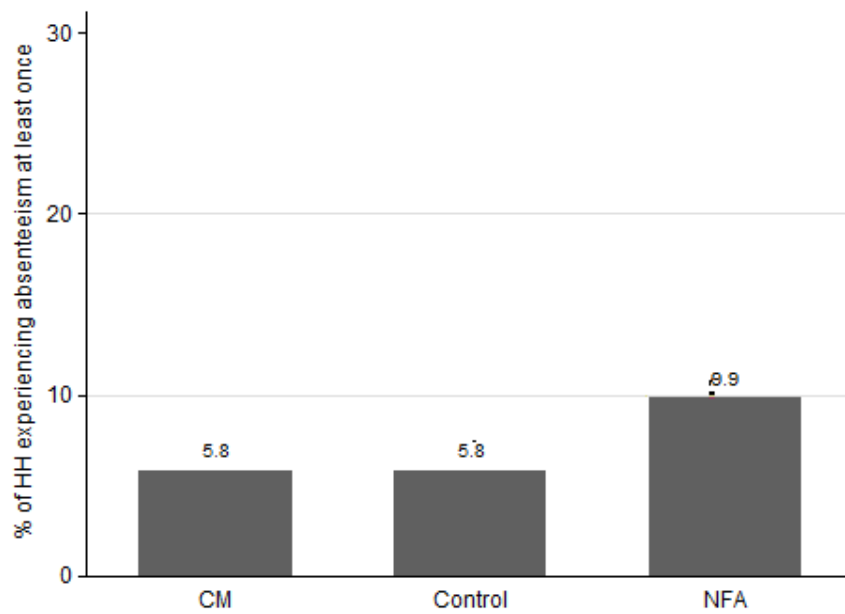
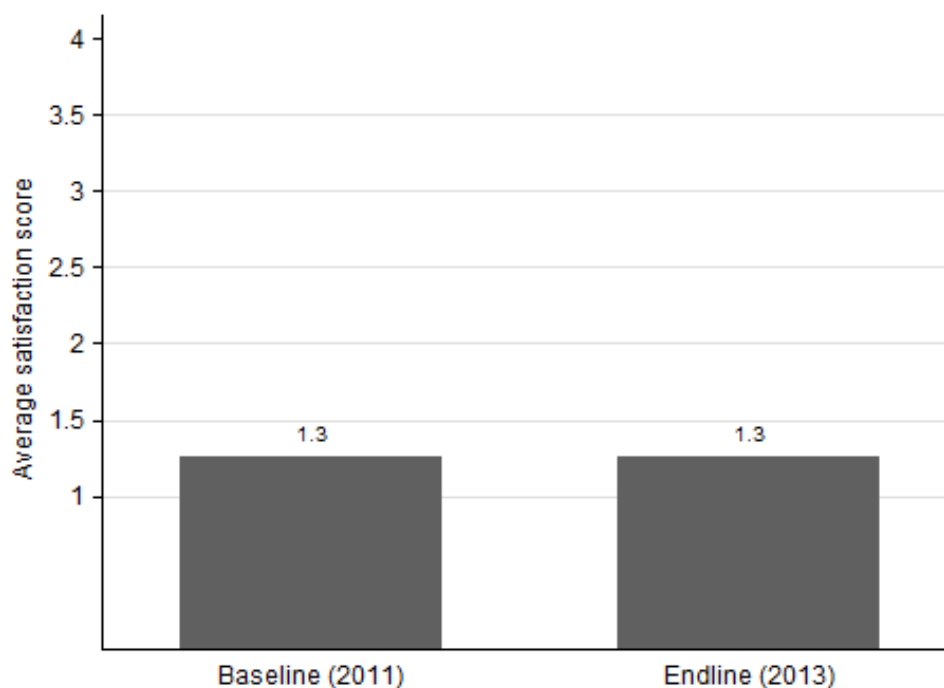


Figure 10: Time trend. Average attitude score



Malnutrition and poor anthropometric outcomes are considered to be both a cause and a consequence of poor health. Worms and frequent diarrhea, to name only two, lead to nutrient deficiency and malnutrition in children. Malnutrition and poor health, already undesirable on their own, in turn also affect a wide variety of socio-economic outcomes such as labor supply and income.

Through improved medical care in target clinics, both interventions can plausibly affect malnutrition in children. Anthropometric outcomes, such as height and weight make it possible to draw inferences on children’s past and present nutritional status and can thereby shed light on past and present (protein-energy) malnutrition. During the endline data collection, information on height, weight, and arm circumference was hence collected for all children under the age of five.

Following the WHO’s methodology, height-for-age, weight-for-height, and weight-for-age were calculated for every child. These anthropometric indices are informative about both acute and chronic malnutrition. Height-for-age, a measure of linear growth, is considered to capture the effects chronic malnutrition. Weight-for-age, on the other hand, is considered to be a measure of current nutritional status. Weight-for-height, a composite measure of the two, is considered to be an overall indicator of a population’s nutritional health. For all indices, the outcomes for each child were compared to those of children of the same sex and age in the NCHS/WHO international reference population.

In the case of height-for-age, for example, the height of a child from the survey is compared to that of a child of the same sex and age from the international reference population; this simple comparison allows to establish whether a child in Sierra Leone is tall or short by international standards. Similarly, for weight-for-height, the weight of a child from the survey is compared to the weight of a child of the same sex and height from the international reference population. Low weight-for-height hence simply means that a child weighs little, considering how tall s/he is. As is common methodology, differences in outcomes between Sierra Leonean children and children of the international standard population are expressed as z-scores, allowing for easy comparison across age and sex. A z-score states by how many standard deviations a given outcome for a Sierra Leonean child differs from the same outcome for an average child (of same sex and age) in the reference population.

Chronic malnutrition, as measured by height-for-age, is very severe among the children surveyed. Children in the sample are on average 2.24 standard deviations shorter than comparable children in the reference population; 57.5% of children are considered stunted (i.e. more than 2 standard deviations shorter than a comparable child in the reference population). These figures are more dramatic than those of the 2013 DHS, which reports an average z-score for height-for-age of -1.4, and 37.9% of children stunted for its nationally representative sample. Neither intervention had a significant impact on height-for-age. This was to be expected, since height-for-age is a long-term measure of chronic malnutrition, unlikely to change quickly (the endline data collection was conducted around a year after the launch of the intervention).

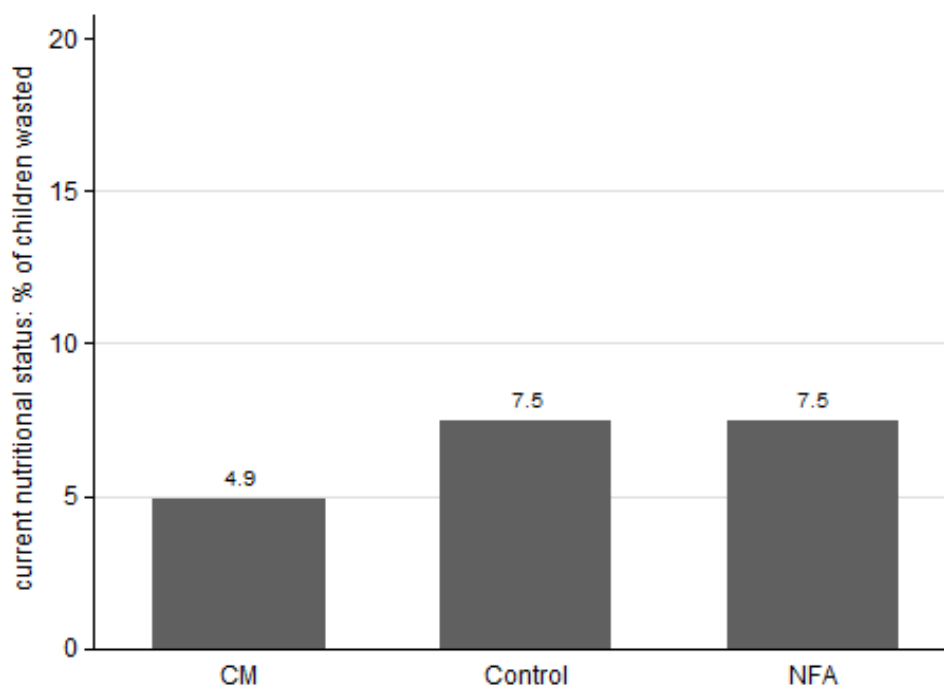
The current nutritional status of children is measured by weight-for-age. A child that is more than two standard deviations below the reference mean is considered too thin for her/his age, or wasted, a condition reflecting acute or recent nutritional deficit. 7.5% of children in the sample are wasted, and 3.8% of children are severely wasted (z-score < -3). The average z-score is 0.53. The 2013 DHS reports similar figures, finding 9.3% of children wasted and 4.0% of children severely wasted. The average z-score reported by the DHS is 0.0.

Figure 11 shows the study's finding on the interventions' impacts on the current nutritional status of children, as measured by weight-for-age.

Wasting is reduced among children in villages subject to the community monitoring intervention: children in CM villages weigh on average 0.175 standard deviations more than similar children in control villages, this effect is statistically significant. Furthermore, the number of stunted children in CM villages is 3.3 percentage points lower. Taking into account that 7.5% of children in the control group are classified as wasted, this means that the CM intervention has reduced the number of wasted children by 44%. It hence appears that community monitoring has improved the current and recent nutritional status of under-5 children. The non-financial awards intervention, on the other hand, does not appear to have improved children's short-term nutritional status.

Weight-for-age is a composite measure of both weight-for-height and height-for-age. It

Figure 11: Treatment effects. Current nutritional status: % of children wasted



is hence affected both by acute malnutrition (wasting) and chronic malnutrition (stunting); a child can be underweight for her/his age because s/he is stunted, wasted, or both. Weight-for-age is hence an overall indicator of a population's nutritional health. Of the children surveyed, 21.3% were underweight (z -score < -2), and 8.8% were severely underweight (z -score < -3); the mean z -score was -0.82 . Based on these figures, malnutrition appears worse than in the 2013 DHS, which finds that 16.4% of children were underweight, and 5.6% of children were severely underweight, while the average z -score was also -0.8 .

3.11 Maternal and under-five mortality

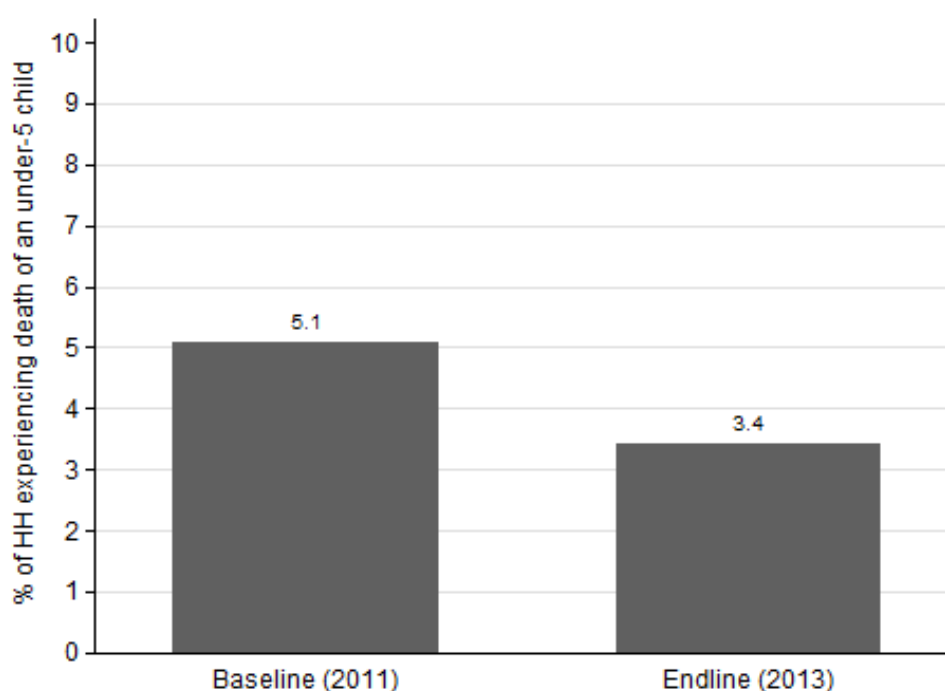
Maternal and under-five mortality reduced significantly between 2011 and 2013. Neither intervention had a significant impact on either type of mortality.

Although progress has been made, under-five and maternal mortality remain high in Sierra Leone; the 2013 DHS reports an under-five mortality of 156 deaths per 1,000 live births. Improved delivery of public health services can plausibly affect both under-five and maternal mortality. The impact of the interventions on both types of mortality is hence evaluated. The household surveys collected information on deaths of under-five children and mothers during childbirth. For each household, a dichotomous variable

(indicating if any death had occurred) was computed for both under-five and maternal deaths.

Figures 12 and 13 display the time trends graphically. At the 2011 baseline, 5.1% of households declared at least one death of an under-five child in the past six months, for a total of 254 under-five deaths. At the 2013 endline, the proportion of households declaring at least one death of an under-five child in the past six months was lower at 3.4%, for a total of 166 under-five deaths. In the baseline survey, 0.65% of households experienced a maternal death during childbirth; 0.07% of households did so in the endline survey.

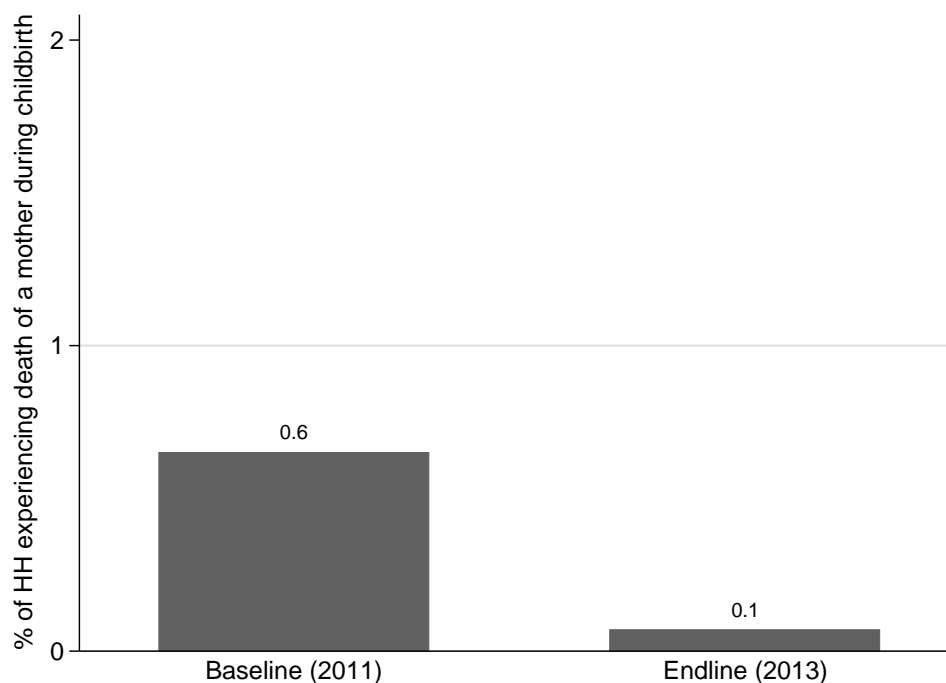
Figure 12: Time trend. % of households experiencing the death of an under-five child



These reductions in mortality between baseline and endline are large and significant. However, the size of the reductions in mortality does not differ between the treatment and control groups; neither intervention had a significant (additional) impact on reducing mortality.⁶

⁶An in-depth study of changes in mortality rates would require a larger sample size: the occurrence of death within the household is much rarer than the occurrence births, pregnancies or illnesses, for example. This relatively small sample size can only allow to capture important changes in mortality rates across treatment and control groups.

Figure 13: Time trend. % of households experiencing the death of a mother during childbirth



4 Cost-effectiveness analysis

Comparison of Community Monitoring and Non-Financial Awards

The total direct cost of the intervention sums the costs of the implementing partner NGOs (Concern, IRC, Plan International) and IPA's costs in generating scorecards and rankings, and monitoring the intervention. Implementing partner costs were derived from partner financial reports,⁷ while expenses associated with the generation of scorecards and clinics ranking, as well as IPA monitoring costs, were projected.⁸ The total direct costs are divided into four categories: Personnel (35% of the total cost on average for both interventions), Equipment and Supplies (16% of the total cost), Reimbursable Expenses (28.5% of the total cost) and Other Costs (including direct project activity

⁷The implemented costs incurred by Plan International were projected using the financial reports provided by Concern and IRC.

⁸Since the scorecards and the rankings have been generated using the data collected during the clinic survey, it was not possible to dissociate the cost associated to the collection of information relative to scorecards and rankings and total survey cost. The costs has been projected on the basis of a two weeks data collection period involving three enumerators, and including survey training. The monitoring costs were projected on the basis of one monitoring visit conducted by one surveyor in half of the community monitoring intervention clinics.

costs, 20.5 percent).

For the Community Monitoring intervention, the total cost of implementation in four districts is \$513,436 (SLL 2,156,430,914). This figure is lower for the Non-Financial Awards intervention, with \$316,103 (SLL 1,327,631,041) spent in total in the implementation districts.

The cost-effectiveness analysis focuses on four main outcomes: institutional deliveries, the likelihood of paying illegal fees, clinic utilization and the prevalence of wasting among under-five children. More precisely, in the Community Monitoring treatment villages, the number of households declaring that at least one pregnant woman had given birth in a government clinic in the past year (among households declaring one birth in the past year) increases by 10%. Households were 1% more likely to go to the target clinic. Moreover, the number of households reporting that at least one member had paid illegal fees in the past month (among households having visited the target clinic in the past month) decreases by 28%. Finally, the number of children considered as wasted is reduced by 44%.

To determine the absolute impact of the Community Monitoring intervention, projections of the catchment area population were made based on the data collected on one hand, and the 2004 population census data on the other hand.⁹ In absolute terms, the impact of the Community Monitoring intervention on the four main outcomes is as follows.

- Institutional deliveries: 707 additional households have at least one woman who has given birth in a government clinic rather than at home or in another health facility (994 households with census data).
- Utilization: 2645 additional households are using the target clinic (3791 households with census data).
- Illegal fees charging: the number of households declaring illegal fee charging decreases by 974 households (1390 households with census data).
- Wasting: the number of children considered as wasted is reduced by 1578 children.¹⁰

Based on these impact figures and on the expenses reported by the implementing partners, it is possible to compare effectiveness and cost of the intervention, for each positively affected outcome:

- Institutional delivery: with \$513,436 spent in the Community Monitoring treat-

⁹Using the data collected at endline, the catchment area population was deduced from the figures provided by the clinics in the PHU questionnaire. Using the census data, the catchment population was deduced from the average population by locality and average number of localities by health center for each intervention district.

¹⁰Information on specific age groups is not readily available from the 2004 population census. For this reason, there are no projections of the under five population in the catchment area based on the census data.

ment clinics, institutional delivery in government clinics increased by 10%. This represents a cost of \$726 per additional household declaring having a woman having given birth in a government clinic (\$517 with census data).

- Utilization: target clinic utilization at the household level increased by 11 percent, representing \$194 per additional household (\$135 with census data).
- Illegal fees charging: the \$513,436 spent on the Community Monitoring intervention resulted in a 28% decrease in illegal fees charging, which corresponds to \$527 per household (\$ 369 with census data).
- Wasting: wasting was reduced by 44 percent, representing \$325 per child.

On the other hand, the Non-Financial Award intervention failed to substantially affect the quality and the quantity of health services provided by public health centers and had no impact on the nutritional status of under-five children. The comparison between the two treatment groups is therefore straightforward: Community Monitoring is more cost-effective than Non-Financial Awards in the context of this study.

Comparison with other interventions

To put in perspective the cost-effectiveness of the intervention, it is possible to compare these results with the findings of other works studying the effect of community monitoring on the quality of health service provision and health outcomes. Here, the analysis will focus on the impact of several interventions on children’s malnutrition. As of now, there is no study providing rigorous evidence on the impact of another intervention implemented in Sierra Leone and focusing on health service provision and nutritional outcomes. Therefore, it is not possible to put these results in perspective in the Sierra Leonean context. An alternative is to assess how well the Community Monitoring intervention performs internationally. One must keep in mind that malnutrition is a multi-dimensional concept that can be defined in several ways, and that implementation costs (wages, equipment, transport etc.) differ across countries.

In Indonesia, the evaluation of the Generasi program, relying on explicit – financial – performance incentives and aimed at improving maternal and child health and education, shows that the intervention reduced malnutrition by 15 percent¹¹ (Olken et al., 2012). Overall, the cost of pulling a child out of malnutrition was \$ 385 to \$ 528 per child. It is worth noticing that the program also improved child mortality and education outcomes, but did not affect institutional deliveries.

Another program based on Community Monitoring was the subject of an RCT in Uganda (Bjorkman & Svensson, 2009). This intervention was shown to increase the weight-for-age z-scores of children under 18 months of 0.14 units on average, which corresponds to a reduction in risk of mortality of 7%. The study only provides cost-effectiveness figures

¹¹Defined as weight-for-age z-score lower than -2 standard deviation from the standard distribution mean.

based on the overall effect of the intervention: the estimated cost of averting the death of a child under five is around \$300.

5 Outreach

IPA will work closely with key partners who are in the best position to disseminate the results of the experiment and implement the program at scale. Specifically, these are (1) the Government of Sierra Leone, through the Decentralization Secretariat (DecSec) and the Ministry of Health and Sanitation (MoHS), which have been central to the design and implementation of the intervention to date, and are interesting in scaling up the components that work; (2) The World Bank’s Justice for the Poor program, which has through the Decentralized Service Delivery Project committed to funding the scaled-up program; and (3) IRC, Concern Worldwide and Plan International, the implementing partners operating in the four target districts. Details of each partner’s contribution and future involvement are provided below.

In addition, the rich and extensive survey data collected as part of this research will be used to inform post-Ebola response in Sierra Leone. The two rounds of the survey (2011 and 2013) provide a snapshot of Sierra Leone’s health system before and two years after the injection of donor funding related to the Free Health Care (FHC) Initiative. As such, these data offer insights into the prospects for post-Ebola recovery, as well as highlight systemic weaknesses that were not addressed by the FHC Initiative. IPA is currently working with researchers at the World Bank’s Development Impact Evaluation Initiative (DIME) and Health, Nutrition and Population Global Practice to incorporate insights from the data into the World Bank’s health sector strategy for Sierra Leone.

5.1 Partners

DecSec and the World Bank’s Justice for the Poor (J4P) program have significantly contributed to the substance and design of this report. The J4P program has also provided technical assistance to the implementing partners on the methodology and design of the intervention, and has been involved in the data collection process. IPA has regularly sent drafts of the reports for review to both institutions, and received feedback on the empirical strategy and overall research framework.

Going forward, IPA and the Principal Investigators will leverage their links to these institutions by making strategic presentations to decision-makers. In addition, IPA will facilitate and support the decision-making process between the Decentralization Secretariat and World Bank’s Justice for the Poor program. IPA has tailored the final report to a policymaker audience by concentrating on the relevance of these results to policy and displaying results in a non-technical manner.

The results will be presented to both the Decentralization Secretariat and the World Bank. We intend these presentations to be a forum for further discussion and a medium for ensuring that key partners understand the main takeaways from the evaluation. IPA and the Principal Investigators will facilitate, support and participate in subsequent decision-making process by the World Bank and the Decentralization Secretariat.

For wider dissemination, IPA will create a policy brief and presentations highlighting the main results of the study, emphasizing the relative effectiveness of the Community Monitoring intervention and discussing whether the cost effective analysis provides a case for scale-up that will be used to inform a broader audience, including within the Government of Sierra Leone and the World Bank, and outside. Finally, the results of this experiment will be written up in a technical paper and presented to research audiences through conferences and seminars.

6 Conclusion

This document summarizes the findings of the Community Monitoring and Non-Financial Award interventions in 254 rural clinics in Sierra Leone. We find that the Community Monitoring intervention has a significant impact on the “extensive” margin of fees paid by pregnant women, mothers and children: fewer households declare having been charged with illegal fees for treatment. In addition, we find that households in the catchments of Community Monitoring clinics report significantly more births in a government clinic, rather than at home or another health facility. Thus, the intervention motivated mothers to give birth in government facilities. Furthermore, households in villages undertaking Community Monitoring report higher clinic utilization. Lastly, the current nutritional status of under-five children, as measured by weight-for-age, is significantly better in Community Monitoring villages. Considering that the main objective of the Free Health Care Initiative is to increase the provision of primary health care to these vulnerable populations, this result suggests that Community Monitoring can be effective in furthering this goal of the Free Health Care Initiative. However, immunization, antenatal care, absenteeism, and staff attitude were not affected by the Community Monitoring intervention.

In addition, we find little impact of Non-Financial Awards on our indicator variables, suggesting that this intervention may not be effective in affecting health and service delivery outcomes. In fact, households living in the catchments of Non-Financial Award clinics display a somewhat higher probability of experiencing nurse absenteeism, although this effect departs from a low baseline probability in the control group.

The analysis shows that Community Monitoring affects some health and service delivery outcomes, such as illegal fee charging, institutional delivery, clinic utilization, and children’s nutritional status, while non-financial awards do not lead to significant improvements along these and other dimensions. Overall, this suggests that initiatives focusing on reinforcing the accountability and monitoring structures at the community level can play an essential role in improving the quality and the quantity of health service delivery but also health outcomes, like acute malnutrition. The need for intervention favoring relationship between the community and the health workers has only been reinforced by the recent Ebola outbreak, that has revealed a general distrust of the formal health sector in the population. Therefore, community monitoring could be a relevant and effective approach to rebuild and strengthen the health care system in post-Ebola Sierra Leone.

References

- Ashraf, N., Bandiera, O. and Jack, K. (2011). No Margin, No Mission? A Field Experiment on Pro-Social Tasks (Working paper). Retrieved from the Harvard Business School website: <http://sticerd.lse.ac.uk/dps/eopp/eopp35.pdf>
- Banerjee, A., Deaton, A., & Duflo, E. (2004). Wealth, Health, and Health Service Delivery in Rural Rajasthan. *American Economic Review Papers and Proceedings*, 94(2): 326-330.
- Basinga, P., Gertler, P., Binagwaho, A., Soucat, A., Sturdy, J., Vermeersch, C. (2010). Paying Primary Health Care Centers for Performance in Rwanda (World Bank Policy Research Working Paper 5190). Retrieved from http://siteresources.worldbank.org/EXTDEV_DIALOGUE/Images/537296-1238422761932/5968067-1269375819845/Rwanda_P4P.pdf
- Bénabou, R., & Tirole, J. (2003). Intrinsic and Extrinsic Motivation. *Review of Economic Studies*, 70(3), 489–520.
- Besley, T., & Ghatak, M. (2008). Status Incentives. *American Economic Review*, 98(2): 206–11.
- Bilardi, J. Fairley, C., Temple-Smith, M., Pirotta, McNamee, K., Bourke, S.,... Hocking, J. (2010) Incentive Payments to General Practitioners Aimed at Increasing Opportunistic Testing of Young Women for Chlamydia: A Pilot Cluster Randomised Controlled Trial. *BMC Public Health*, 10(70).
- Björkman, M., & Svensson, J. (2009). Power to the People: Evidence from a Randomized Field Experiment on Community-Based Monitoring in Uganda. *The Quarterly Journal of Economics*, 124(2), 735.
- Björkman, M., de Walque, D., & Svensson, J. Working paper. Community Based Monitoring: When Does It Work (even in the long run)? Experimental Evidence from Uganda
- Camerer, C., & Hogarth, R. (1999). The Effects of Financial Incentives in Experiments: A Review and Capital-Labor-Production Framework (California Institute of Technology Social Science Working Paper 1059). Retrieved from: <http://www.springerlink.com/content/wh218110256r8t00/>
- Christianson, J., Leatherman, S., & Sutherland, K. (2007). Financial Incentives, Healthcare Providers and Quality Improvements: A Review of the Evidence. London: Health Foundation, 2007.
- Frey, B., & Neckermann, S. (2010). Awards as Signals (CREMA Working Paper Series 2010-21). Center for Research in Economics, Management and the Arts (CREMA). Retrieved from: <http://www.iew.unizh.ch/wp/iewwp513.pdf>

- Greevy R, Xu X., Lu B., Beck C. (2011). Optimal Nonbipartite Matching and its Statistical Applications. *The American Statistician*. 65(1): 21-30.
- Huntington, D., Zaky, H., Shawky, S., Fattah, F., & El-Hadary, E. (2010). Impact of a Service Provider Incentive Scheme on Quality of Reproductive and Child-Health Services in Egypt. *The Journal of Health, Population and Nutrition*, 28(3): 273-280.
- Kosfeld, M., & Neckermann, S. (2011). Getting More Work for Nothing? Symbolic Awards and Worker Performance. *American Economic Journal: Microeconomics*, American Economic Association, 3(3): 86-99.
- Kreps, D. (1997). Intrinsic Motivation and Extrinsic Incentives. *American Economic Review Papers & Proceedings*, 87: 359-364.
- Mathauer, I., & Imhoff, I. (2006). Health Worker Motivation in Africa: The Role of Non-Financial Incentives and Human Resource Management Tools. *Human Resources for Health*, 4(24).
- Olken, B., Onishi, J., & Wong, S. (2012). Should Aid Reward Performance? Evidence from a Field Experiment on Health and Education in Indonesia. NBER Working Paper 17892.
- Stilwell, B. (2001). Health Worker Motivation in Zimbabwe. In an unpublished report for the Department of Organization of Health Care Delivery Geneva: World Health Organization.
- Tirole, J. (1996) A Theory of Collective Reputations (with Applications to the Persistence of Corruption and to Firm Quality). *The Review of Economic Studies*, 63: 1-22.
- Van Herck, P., De Smedt, D., Annemans, L., Remmen, R., Rosenthal, M., & Sermeus, W. (2010). Systematic Review: Effects, Design Choices and Context of Pay-for-Performance in Health Care. *BMC Health Services Research*, 10(247).
- Witter, S. Zulfqir, T., Javeed, S., Khan, A., & Bari, A. (2011). Paying Health Workers for Performance in Battagram District, Pakistan. *Human Resources for Health*, 9(23).
- Yared, A. (2009). Non-Financial Incentives for Voluntary Community Health Workers: A Qualitative Study (Working Paper No. 1). Retrieved from the JSI Research & Training Institute, Inc. website: http://110k.jsi.com/Resources/Docs/nfi_workingpaper_vol2.pdf