

# Community Based Monitoring: When Does It Work (even in the long run)? Experimental Evidence from Uganda\*

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March 2012

**Abstract:** Community Driven Development (CDD) is one of the most frequently advocated processes for managing and implementing (local) development programs. The CDD approach operates on the principles of participatory governance (stimulate participation by intended beneficiaries) as a mechanism to strengthen demand-responsiveness and local accountability. This paper provides evidence of impact of the CDD approach in a context -- primary health care delivery in Uganda -- previously shown to be conducive to this kind of process interventions. We contrast the results of the CDD intervention with a more elaborated intervention that adds dissemination of information on what the beneficiaries should expect and are currently experiencing. The CDD intervention had little measurable impact on health workers' performance or the quantity and quality of health care in the short and medium run, while the intervention combining information and participation showed significant improvements in both health care delivery and health outcomes after four years. Taken together, the evidence suggests that enhanced participation alone has little impact without changing the underlying informational asymmetries. Interventions that relax these informational constraints, and provide communities with a clear agenda, however, can result in large and sustained long run improvements in both health service provision and health outcomes.

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**Acknowledgement:** We are deeply indebted to Frances Nsonzi for her contributions at all stages of the project. We would also like to acknowledge the important contributions of Ritva Reinikka, Monica Kipiriri, Gibwa Kajubi, Abel Ojoo, Anthony Wasswa, James Kanyesigye, Peter Okwero, Robert Chase, Carolyn Winter, Ivo Njosa, Omiat Omongin, Mary Bitekerezoo, and the field and data staff with whom we have worked over the years. We thank the Uganda Ministry of Health, Planning Division, the World Bank's Country Office in Uganda, and the Social Development Department, the World Bank, for their cooperation. We are grateful for comments and suggestions by seminar and conference participants at Dartmouth, University of Michigan and the AEA meetings (Chicago 2012). Financial support from the Bank-Netherlands Partnership Program (BNPP), the World Bank Research Committee, the World Bank Africa Region division, the Gender Action Plan (GAP) and the Strategic Impact Evaluation Fund (SIEF) at the World Bank, the Swedish International Development Agency, Department for Research Cooperation and Handelsbanken's Research Foundations is gratefully acknowledged. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

## **I. Introduction**

Community Driven Development (CDD) has become one of the most popular approaches for poverty reduction (broadly defined) in developing countries. The World Bank alone spends an estimated 60 billion US\$ a year in programs/projects where the CDD approach is a key part of the design. The CDD approach operates on the principles of local empowerment and participatory governance as mechanisms to strengthen demand-responsiveness and local accountability. The core of the CDD strategy is the process through which (local) decisions are made and executed and this process is applied to a broad spectrum of development projects (from local infrastructure projects to monitoring of health clinics and schools). While there are variations across projects, in practice community driven development is achieved through facilitated meetings. In these meetings the communities are assisted by trained facilitators to organize management teams, to decide their priorities (development planning) and to execute these plans (development implementation).

This paper provides evidence of impact of the CDD approach in a context - primary health care delivery in Uganda - previously shown to be conducive to this kind of process interventions. We contrast the results of the CDD approach with a more elaborated intervention that adds dissemination of information on what the beneficiaries can expect and are currently experiencing.

The CDD intervention had little measurable impact on health workers' performance or the quality of health care in the short and medium run. In contrast, the intervention combining information and participation showed significant improvements in both health care delivery and health outcomes both in the short run (as reported in Bjorkman and Svensson, 2009) and in the longer run (after four years).

Taken together, our results provide both encouraging, and less encouraging, news for those promoting the greater exercise of beneficiary control. We find that enhanced participation alone has little impact without changing the existing informational asymmetries. In most cases, these informational asymmetries benefit the elite (in this case the health clinic staff) at the expense of the beneficiaries. However, interventions that relax the intended beneficiaries' informational

constraints, and provide communities with a clear agenda, can result in large and long run improvements in both health service provision and health outcomes.

There is a small and recent literature on the impact of beneficiary control, showing mixed results<sup>1</sup>. As pointed out in Banerjee et al (2010), from the available evidence it is difficult to disentangle whether the mixed findings are driven by differences in the details of the intervention or context<sup>2</sup>.

In this paper we try to push this research frontier forward in two ways. First, we compare two interventions, with and without information dissemination, in a context which has been shown to be highly conducive to this kind of interventions. Thus, we can be fairly confident that differences in outcomes should not be driven by context specific factors. Second, for one of the interventions (information and participation) we evaluate the long-run effects; i.e. the effects four year after the initial intervention. This is important because process-based interventions like the CDD, or variants of it, are primarily meant to (informally) influence norms and collective actions and thus influence local decision making also in the longer run. In addition, while randomized controlled trials have become a fairly common tool in development economics, to date very few evaluations assess more long term impacts.

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<sup>1</sup> Mansuri and Rao (2004) provided a critical review of CDD programs and concluded that, as of 2004, not a single study establishes a causal relationship between any outcome and participatory elements of a CDD project. Since then, Olken (2007) finds minor effects of an intervention aimed at increasing community participation in the monitoring of corruption in Indonesia. Banerjee et al. (2010) find little impact of an intervention aimed at encouraging beneficiaries participation in primary education in India, while Duflo et al. (2009), in an intervention focusing on strengthening one particular institution (school management committees) rather than the community at large, find positive effects on student learning. Casey et al. (2010) evaluate an infrastructure project in Sierra Leone. The intervention involved both relatively large grants and the application of the CDD-strategy in the planning and implementation phases. While the evaluation cannot separately assess the impact of the process from the impact of the grant, they do not find any evidence that the intervention led to fundamental changes in collective action at the village level.

<sup>2</sup> For example, on the details of the intervention whether to focus on stimulating participation vs. focus on informing beneficiaries about what they should expect and are currently experiencing; or providing general tools for monitoring vs. assisting them to agree on a specific agenda. On context, whether sector matters (education vs. health) or whether the effects are conditional on(unobserved) country or regional factors.

Section II presents the institutional setting for our study and outlines a moral hazard framework that describes the different components of the two interventions we are evaluating and distinguishes the mechanisms through which they can operate. Section III details our evaluation design, the features of the two interventions evaluated and the data we collected in Uganda for this project. Section IV defines the outcomes used in the study and describes our statistical framework while section V presents the impact evaluation results. Section VI discusses our results and the policy recommendations they imply.

## **II. Institutional setting and framework**

### **2.1 Context**

The experimental study took place in 75 rural communities served by a public primary health facility (or dispensary) in nine districts covering all four regions of Uganda. Dispensaries are in the lowest tier of the health system where a professional interaction between users and providers takes place. According to the government health sector strategic plan, the standard for dispensaries includes preventive, promotional, outpatient care, maternity, general ward, and laboratory services (Republic of Uganda 2000) and these services should be provided for free.

The health sector in Uganda is decentralized and a number of actors are responsible for supervision and control of the dispensaries. At the lowest tier, the Health Unit Management Committee (HUMC) is supposed to be the main link between the community and the facility. Each dispensary has an HUMC which consists of both health workers and non-political representatives from the community. The HUMC should monitor the day-to-day running of the facility but it has no authority to sanction workers<sup>3</sup>.

As discussed in our previous work (Bjorkman and Svensson, 2009), the setting for our experimental study - rural Uganda - is characterized by poor public health service provision (large X-inefficiencies). The baseline data reveals, for example, that roughly 50% of the staff are

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<sup>3</sup> There are two additional layers of institutionalized support and monitoring within each district: The Health Sub-district authority and the District Service Commission. The latter has the authority to suspend or dismiss staff. Based on data from the baseline survey, neither of these institutions appears to be actively involved in monitoring.

absent from the clinic a typical day (based on observational data from unannounced visits). The average waiting time is more than two hours and only four out of ten patients report that any equipment was used the last time the respondent (or the respondent's child) visited the clinic<sup>4</sup>.

## 2.2 Framework

The current agenda in development policy places a strong emphasis on institutionalized community participation and agencies such as the World Bank recommend it to be part of all (most) government programs they fund. Many developing countries government are also stressing the need to get the community more involved in local governance, in particular in primary health and education.

Community-based monitoring is viewed as a mechanism to elicit effort from the service providers (in this case health staff). The service providers (workers) may be intrinsically motivated but hampered and demoralized by the same system of weak accountability relationship that frustrates users.

It is illustrative to view the various efforts to encourage community participation and monitoring within a simple moral hazard framework. In such a framework, a principal designs a contract to the agent, where the extent of effort exerted by the agent depends on the principal's ability to assemble information about effort and the compensation scheme. The model thus highlights (A) the design of a contract that spells out actions and consequences; (B) the cost and availability of information; and (C) the ability to reward or punish the agent. When applying this model to community monitoring one must also take into account the fact that then there are multiple principals (the users) that may disagree about both objectives and awareness about what they can demand. This therefore raises two additional points, namely that (D) the rules of the game is clearly understood by the principals; and (E) that there is an agreement about the objectives.

Effort to stimulate community participation differ both in the extent to which these five core issues are addressed and exactly how they are addressed. In general, one can view the

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<sup>4</sup> While we have no data on the clinicians' workload, other estimates from similar settings suggest a low workload. For example Bold et al. (2011) estimate, combining observational data on time spent per patient with facility records on number of patients treated per day, that the total time spent counseling patients per day and clinician in rural primary health clinics in Tanzania and Senegal is only 26 minutes.

participatory components of a community monitoring project as dealing with contract design (*A*) and the process of reaching an agreement (*E*). The information components (if any) are intended to deal with the asymmetric information problem (*B*) and citizens' lack of awareness of what they are entitled to (*D*). In most CDD based programs, the compensation scheme (*C*); i.e., the ability to reward and punish the agent, is typically not explicitly addressed. Instead the process relies on informal forms of social recognition and/or social opprobrium<sup>5</sup>. This may be defended on the ground that non-financial rewards (social recognition) may be just as effective at eliciting effort as financial incentives (within reasonable bounds)<sup>6</sup>.

In this paper we conduct two experiments. First we compare an intervention (treatment arm *AE*) that address issues *A* (contract design) and *E* (process of reaching an agreement) with an intervention (treatment arm *ABDE*) that also addresses issues *B* (asymmetric information on performance) and *D* (awareness of entitlements). The objective of this comparison is to identify what mechanisms are crucial for this kind of process interventions to work. The comparison is also important because the *AE* intervention largely mirrors the typical CDD intervention. Moreover, as encouragement of participation is both technically and financially a much simpler (and cheaper) intervention, if the effects are largely similar there is no rationale to implement the more elaborate version.

Second, we provide evidence on the long-run impact; i.e. the effects four years after the initial intervention, of the *ABDE* experiment. Assessing long term effects is important as one might worry about “Hawthorne” effects in which any intervention that puts attention on the health providers could have a short-run impact given the large pre-existing X-inefficiencies in the public health care system. Assessing long run effects is also important because process-based interventions like the CDD, or variants of it, are primarily meant to (informally) influence norms and collective actions and thus influence local decision making also in the longer run.

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<sup>5</sup> Duflo, Dupas, and Kremer (2009) is an exception. They evaluate an intervention in which school committees were trained in how to monitor contract teachers that they had the power to fire. However, their intervention dealt with empowering a specific institution (school committees) rather than the community at large so the intervention should not be viewed as a typical CDD process intervention.

<sup>6</sup> For example, Ashraf et al. (2011), in an experimental study in Zambia, find that the effect of financial rewards, both large and small, is orders of magnitude smaller than non-financial ones in eliciting effort in a project in reproductive health care.

### **III. Experimental design and data**

#### **3.1 Overview**

In response to perceived weak health care delivery at the primary level in Uganda, a pilot project was initiated in 2004 and extended in 2006 with the aim to enhance community involvement and monitoring in the delivery of primary health care. The project included 75 project facilities and its users (all in rural areas) drawn from nine districts in Uganda. The catchment area or community for each dispensary is defined as the households residing in the 5-km radius around the facility. A community in our sample has, on average, 2,500 households residing within the five-kilometer radius of the clinic, of which 350 live within a one-kilometer radius. For the experimental design, the facilities were first stratified by location (districts) and then by population size.

50 facilities were included in the pilot in 2004 and 25 facilities were added in 2006. From each group, half the units were randomly assigned to the treatment group and the remaining health facilities were assigned to the control group. The project was designed by staff at Stockholm University and the World Bank and was implemented by 18 community-based organizations who received specific training. It has been running from 2004 to 2009

#### **3.2 Interventions**

We implemented two different interventions with the aim of distinguishing which mechanisms are key for community monitoring projects to work. The first intervention is a standard CDD model and the second intervention is a more elaborated CDD model that includes a strong information component that we call the CDD + Information model.

##### **3.2.1. Community Monitoring Project I: "The standard CDD model"**

Going back to the moral hazard framework we defined earlier, the standard CDD model consists of two components: a contractual design (component A) and the process of reaching an agreement (component E).

In component (A), the contractual design, the users of the health facility and the health providers agreed on a joint "contract", called "action plan". This action plan focused on steps to

be taken to improve service delivery within the existing resource envelope. It outlined the community's and the provider's joint agreement on what needs be done, how, when, and by whom. The action plan also identified how the community was to monitor the provider and established a time plan. Both the community and the health providers received a copy of the action plan.

Component (E) is the process of reaching an agreement, i.e. the process that led to the contract or action plan (component A). This process includes a series of meetings facilitated by local community-based organizations (CBO): a community meeting, a health facility meeting and an interface meeting. Those meetings used traditional participatory methods, such as focus group discussions, Venn diagrams, role plays etc., to encourage participants to develop a shared view on how to improve service delivery and monitor health providers.

The community meeting is a 2-afternoon meeting with community members from all spectra of the society (young, old, disabled, women, leaders etc.). Parts of the meetings are held in sub-groups (young, women, etc.) so that each group can voice their concerns and so that the process is not dominated by elites. Community members scored the services provided by the facility on a scale from 0 to 100 on a set of performance indicators they viewed as important and used this rating as the baseline for their reform agenda. By the end of the meeting, the community had developed a plan for how to improve health service delivery. Although the issues raised in the action plans differed across communities, a common set of concerns included high rates of absenteeism, long waiting time, weak attention of health staff, and differential treatment. On average, more than 150 participants per day and per village attended the community meetings.

The health facility staff meeting is a half-day meeting, usually held in the afternoon at the health facility with the health facility staff. The health providers evaluate and score their own performance and discuss ideas for improvements. The interface meeting includes representatives from the community and all health facility staff. Representatives of the community and health workers present and discuss their suggestions for improvements. They then agree on priorities based on those suggestions and jointly agreed upon actions to be taken, to be included in the community contract or action plan.

After those initial 5 days of facilitated meetings which led to the design of the action plan, the communities themselves had the responsibility to monitor the implementation of the action plan and quality of the services provided at the health facility. At mid-term in 2008, there



was a one-day repeat engagement on a smaller scale facilitated by the CBOs during which health workers and community members discussed suggestions for sustaining or improving progress on the issues outlined in the joint action plan. The standard CDD model experiment involved 25 project facilities and its users (half of those facilities were randomly selected in the intervention group and the other half to the control group) and was implemented from mid-2007 to mid-2009 as illustrated in Figure I.

### **3.2.2. Community Monitoring Project II: "The CDD + information model"**

The CDD + Information model is a more elaborate CDD intervention that includes the components ABDE in the moral hazard framework we defined earlier. Components A (contractual design) and E (process of reaching an agreement) are the same as in the standard CDD intervention with the three meetings (community, facility and interface) facilitated by the CBOs. The difference is that CDD + information model also includes components (B) and (D) of our moral hazard framework: provision of quantitative information on the status of service provision (B) and awareness raising of what citizens are entitled (D) to.

Component B aims at reducing information asymmetries by providing to the community and the health facility staff, during the meetings, relevant information on the status of health service delivery. Specifically, a unique report card was established for each facility summarizing information that were identified from the baseline data as key areas subject to improvement (utilization, service quality, and comparisons vis-à-vis other health facilities). The report card was established in comparison with the average performance of other facilities nationally and at the district level. The report card aimed to relax the beneficiaries' informational constraint and help build the reform agenda on the "true" (as opposed to the perceived) status of service provision. The report cards were translated into the languages spoken in the community and posters were designed to help the non-literate understand the information provided.

Component E focused on raising awareness among the communities about their entitlements as users of health facilities. Communities and health facilities were provided with information on health related rights according to the Ministry of Health guidelines e.g. the right to free services, right to confidential treatment, right to fair and human treatment, right to information on drug availability, etc.

The main intervention for the CDD + Information or ABDE model took place in 2005 and was followed by small scale repeat engagements in the subsequent four years as illustrated in the timeline in figure II. In between this fairly "minimal" intervention (a total of 12 days in 4 years) the communities were left by themselves to monitor the providers as outlined in the agreed upon action plan.

The CDD + Information experiment involved 50 health facilities and its communities (half in the treatment group, the other half in the control group with random assignment) from 9 districts in Uganda. The baseline survey was collected in 2004, a first follow-up survey was collected in 2006 and was used for the short-term impact evaluation reported in Björkman and Svensson (2009) and a long-term follow-up survey used in this paper was collected at the end of 2009, four years after the launch of the intervention. The length of the follow-up period allows us evaluating whether community-based monitoring works in the longer run?

### **3.3 Data**

Data collection was governed by two objectives. The first objective was to create report cards which assess how the community views the quality and efficacy of service delivery. Those report cards, unique for each facility in the CDD + Information model, were used to reducing information asymmetries about the status and the quality of health service delivery. The second objective was to rigorously evaluate the impact of both variations of the CDD interventions.

To meet these objectives, two surveys were implemented: a survey of health care providers and of health facility characteristics and a household survey in the catchment areas of the facilities. A quantitative service delivery survey was used to collect data from the providers. Because health providers may have a strong incentive to misreport key data, the data were obtained directly from the records kept by facilities for their own need (i.e., daily patient registers, stock cards, etc.) rather than from administrative records. The former, often available in a highly disaggregate format, were considered to suffer the least from any incentive problems in record keeping. Data were also collected through visual checks by enumerators.

In total, data from 75 health facilities and from roughly 7,500 household was collected. A stratified random sample of households within the catchment area of each facility was selected and surveyed for the household surveys. In addition to standard socio-demographic characteristics, the household survey collected data on both households' health outcomes and

health facility performance as experienced by the household. The follow-up household surveys also included a shorter module on health outcomes. Specifically, data on child mortality were collected and we measured the height and weight of all infants in the surveyed households.

Data has been collected at three points in time. In 2004, we collected the baseline health facility and household surveys for the CDD + Information project. In 2006 we conducted the first-follow up surveys for the CDD + Information project and the baseline surveys for standard CDD project. In 2009, we implemented the second, long-term, follow-up surveys for the CDD + Information project as well as the first follow-up surveys up for the standard CDD project. This paper mainly uses the data newly collected data in 2009 together with some the data collected during the baseline surveys.

#### **IV. Measured outcomes and statistical framework**

##### **4.1. Outcomes**

Our main outcome of interest is whether the CDD interventions increased the quantity and improved the quality of health services. We start by analyzing the impact of the interventions on process indicators measuring monitoring activities and information exchanges, using indicators both directly observed at the facility and collected at the household level. Next, we focus on indicators reflecting quality of service as reflected by treatment practices, the general management and condition of the clinic and the adherence to the treatment guidelines for antenatal and postnatal care. We then turn to quantity indicators by look at utilization and coverage. Ultimately, we are interested in evaluating the impact of the interventions on actual health outcomes in the population for which we use pregnancy, birth, child mortality and anthropometric measurements of children under 5 as outcome indicators.

##### **4.2. Statistical framework**

To assess the causal effect of the intervention we estimate

$$(1) y_{ijd} = \beta_0 + \alpha T_{jd} + \beta_1 X_{jd} + \theta_d + \varepsilon_{ijd}$$

where  $y_{ijd}$  is the outcome of household I (when applicable) in community or health facility j in district d,  $T_{jd}$  is an indicator variable for assignment to the treatment (the standard CDD intervention or the CDD + Information intervention), X is a vector of pre-intervention characteristics from the facility and  $\theta_d$  are district fixed effects. The baseline covariates included in the vector X are the number of villages in the catchment area, the number of days without electricity in the past month, an indicator variable for whether the facility has a separate maternity unit, the distance to the nearest public health provider, the number of staff with less than advanced A-level education, an indicator variable for whether the staff could safely drink from the water source, and the average monthly supply of quinine.

Because of the random assignment,  $T$  should be orthogonal to X, and the consistency of  $\alpha$  does not depend on the inclusion of X in the model. The regression adjustment is used to improve estimation precision and to account for stratification and potential imbalances at baseline.

For some variables, we collected the information both at the baseline and the follow-up surveys and we can therefore use a difference-in-difference specification and we then estimate:

$$(2) y_{ijt} = \gamma POST + \alpha_{DD}(T_j * POST) + \mu_j + \varepsilon_{ijt}$$

where POST is an indicator for the follow-up survey,  $\mu_j$  is a facility or community fixed effect, and  $\alpha_{DD}$  is the difference-in-difference estimator of the program impact.

For some outcomes we have a group of related outcome measures. To assess the impact of the intervention on a set of  $K$  related outcomes, we follow Kling et al. (2004) and estimate a seemingly unrelated regression system,

$$(3) Y = [I_K \otimes (TX)]\theta + v$$

where  $I_K$  is a  $K$  by  $K$  identity matrix. We then derive average standardized treatment effects,  $\tilde{\beta} = 1/K \sum_{k=1}^K \hat{\beta}_k / \hat{\sigma}_k$ , where  $\hat{\beta}_k$  and  $\hat{\sigma}_k$  are the point estimate and standard error, respectively, for each effect (see Duflo, Glennerster, and Kremer 2007). The point estimate, standard error, and p-value for  $\tilde{\beta}$  are based on the parameters,  $\hat{\beta}_k$  and  $\hat{\sigma}_k$ , jointly estimated as elements of  $\theta$  in equation (3).

## **V. Results**

### **5.1. Balance at baseline**

Tables I and II verify that the experimental design lead to a good balance between the treatment and the control groups. Because we have two interventions that were initiated at different time, we have two different baseline surveys and two different control groups. For the elaborated CDD model including a strong information component (henceforth CDD + Information model or ABDE intervention), the baseline survey took place in 2004. For the standard CCD model (or AE intervention), the baseline survey took place in 2006.

In table I, we compare health facility characteristics in the treatment and control groups in the 2004 baseline for the CDD+information intervention in the first three columns and in the 2006 baseline for the standard CDD model in the last three columns. At both baseline surveys, there were no significant differences across treatment and control facilities for the average number of patients visiting for outpatient care in the last month, the average number of deliveries, and the number of households in the catchment area and in the village where the facility is located. For access to safe water and electricity, the variables were defined somewhat differently in 2004 and in 2006, but in both cases no significant differences were recorded between facilities in the treatment and control groups. In 2006, additional information was collected about the number and categories of staff in the facilities. Treatment and control groups were well balanced as far as the number of doctors, nurses, midwives and nursing aides is concerned. A similar conclusion can be reached for the amount of funds received by the facilities in 2006.

In table II, average standardized pretreatment effects are estimated for each family of outcomes (utilization as reported in health facility records, utilization patterns as reported by the users, quality of services as reported by the users, catchment area statistics, health facility

characteristics, citizen's perception of treatment, supply of drugs and user charges)<sup>7</sup>. In the last column, we add for 2006 a similar average standardized pretreatment effect for the staff characteristics. None of the differences between the effects is significant and we therefore confirm that both in 2004 and 2006, we attained a good balance between the pre-treatment characteristics of the facilities and the population in the treatment and control groups.

## 5.2. Process

A system whereby a member of the survey team originating from the district participated as part of the CBO team confirmed that the initial phase of the intervention that is, the three separate meetings, was properly implemented. After these initial meetings, it was up to the community to sustain and lead the process. In this section we study whether the treatment communities became more involved in monitoring the providers.

To avoid influencing local initiatives, we did not have external agents visiting the communities and could therefore not document all actions taken by the communities in response to the intervention. Still, we have some information on how processes in the community have changed. Specifically, the CBOs submitted reports on what type of changes they observed in the treatment communities and we also surveyed the local councils in the treatment communities. We use facility and household survey data to corroborate these reports.

Table III reports the program impacts on monitoring activities performed and information tools used by the communities. The top panel includes dependent variables collected at the health facility level and based on data collected through visual checks by the enumerators during the post-intervention facility survey. While the standard CDD model had no statistically significant impact on those indicators, the CDD + Information model significantly increased the likelihood that a suggestion box and a staff duty roster were present in the facility. The CDD + Information model also had a positive and statistically significant impact on the average standardized effect for the five variables in columns (i) to (v). It is worth reminding that the impacts from the CDD + Information model presented in table III are long-term impacts, since the intervention took place in 2005 and the post-intervention survey is from 2009. Björkman and Svensson (2009)

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<sup>7</sup> We report the test of the difference in means across control and treatment groups for each individual variable in the appendix.

report positive impacts of the same intervention in 2006 on the presence of a suggestion box, of numbered waiting cards and a poster informing free services, as well as the average treatment effects.

The lower panel of table III analyzes the impact on dependent variables about monitoring and information collected at the household level. The CDD + Information model had a positive long-run effect on whether the household has received information about the HUMC's role and responsibilities, whether the performance of the facility and its staff was discussed in LC meetings, whether a household member told the staff of the facility about their satisfaction or dissatisfaction with the services received, whether they think that the staff at the health facility works closely with the community and whether they know somebody who monitored the facility performance. Similar positive impacts of the CCD + Information model were found in 2006 (Björkman and Svensson 2009). The standard CDD model implemented from 2006 to 2009 also had positive impacts on monitoring and information as reported at the household level, but the point estimates were somewhat smaller and the impact were statistically significant only for the information about the HUMC, the discussion of the health facility in the LC meetings and knowing somebody who monitored the facility's performance.

### **5.3. Treatment practices**

Table III suggests that the CDD + Information model, and to a lower extent the standard CDD model, have increased the monitoring and information exchange taking place at the health facility. Tables IV focuses on treatment practices and indicators of the management of the facility. Both the standard CDD model and the CDD + Information model had no significant impact on the likelihood that any equipment was used during the patient's examination (columns i-ii) and on the waiting time before being examined (columns iii-iv). This is true both in an OLS specification using only the post-intervention data (columns i and iii) and in a difference-in-difference specification (columns ii and iv).

While, there is no significant impact of the standard CDD model on the absence rate of health facility staff, for the CDD + Information intervention, the results point to a –surprising– increase in the absence rate (column v). However, in column (vi), for which the specification includes the share of staff living in the catchment area of the facility and the interaction between

that variable and the treatment indicator, it appears that the increase in the absence rate is not present when the staff resides in the catchment area.

The CDD + information model had a positive impact on the general condition on the clinic as observed by the enumerators and measures by the condition of the floor, walls and furniture and the smell of the clinic. The CDD + information model led to a significant decrease in the probability of drug stock-outs. Those long-term effects of the CDD + Information model were already present in the shorter run, but in 2006, a reduction in waiting time and in the absence rate and an increase in the probability that any equipment was used were also recorded (Björkman and Svensson 2009). For the standard CDD model (2006-2009) no impacts were found on the general condition of the clinic and the probability of stock-outs.

Table V focuses on antenatal care and postnatal care and more precisely assesses whether the impact of the two interventions on whether the clinical guidelines for the examination of pregnant women were respected. The long-run impacts of the CDD + Information model are all positive and statistically significant (upper panel): during antenatal care visits, pregnant women were more likely to be examined by a midwife, to have their weight taken, to have a blood sample taken, to have the fetus checked and to receive information about pregnancy complications. Newborn children were also more likely to be checked at the facility in the first two months after delivery. In contrast, no positive impacts were found on those indicators of the quality of antenatal and postnatal care for the standard CDD model (lower panel). Actually, for the information about pregnancy complications and for health checks for newborn children, the standard CDD model appeared to have had a negative impact.

In brief, while the results on the general treatment practices were contrasted for the CDD + Information model and inexistent for the standard CDD model, there is a sharp contrast when focusing on the quality of antenatal and postnatal care: the CDD + Information model lead to improvements in the quality of pre-and postnatal care, when the standard CDD model did not have such impact.

#### **5.4. Health education and Utilization**

We next turn to assessing the impact of the two interventions on health education and health utilization. Table VI includes result on health education about three of the most prevalent



diseases in Uganda: HIV/AIDS, tuberculosis and malaria. The CDD + Information model had no impact on whether household members had heard of AIDS, but given that the mean in the control group is 0.99, this is not surprising. But the same intervention decreased the probability that the household members expressed stigmatization about AIDS (as measured by agreeing with the statement that people living with AIDS should be ashamed of themselves) and increased the knowledge that tuberculosis is spread through the air and the probability that children were sleeping under a treated mosquito net.

Table VII reports program impacts on health facility utilization and coverage. Columns (i-v) use data collected at the health facility level while columns (vi-viii) use data from the household survey. In the first column, the dependent variable is the average number of patients visiting the facility per month for outpatient care. For the CDD + Information model, there is no significant impact in a regression pooling years 2006, 2007 and 2008 (panel A), but there is a positive impact (at the 10% level) using a panel data specification where the pre-intervention data is from 2004 and the post-intervention data from 2009. There is no significant impact of the standard CDD model. In column (ii) we look at the average number of deliveries at the facility per month. There is no significant impact of the CDD + Information model in both the pooled regression and panel data specifications, but there is a significantly negative impact of the standard CDD model. Columns (iii-iv) investigate the impact of the interventions on the average number of antenatal care and family planning visits, respectively. The detailed information about those visits was not collected at baseline, so that the panel data specification cannot be implemented. The CDD + Information model had a positive impact on the quantity of antenatal care visits, but not on the number of family planning visits. The standard CDD model had no impact on both type of visits. Column (v) includes the average standardized effect of estimates for the dependent variables in columns (i-iv). Both in the pooled regression and in the panel data specifications, there is a positive impact of the CDD + Information model, while that impact cannot be found for the standard CDD model.

Columns (vi – vii) in table VII use information collected in the household survey. The dependent variables are, from health related visits, the share of visits to the project facility in column (vi) and the share of visits to traditional healers or self-treatment in column (vii), averaged over the catchment area. The CDD + Information model has increased (at least in the

pooled regression specification) the share of visits to the project health facility and decreased the share of self-treatment or visits to traditional healers. This is also confirmed in column (viii) that combines the estimates in columns (vi-vii) in an average standardized effect, reversing the sign for visits to traditional healers. The long-run effects of the CDD + Information model in table VII are similar to the short-run effects reported in (Björkman and Svensson 2009), except that there were significantly positive short run impact on the quantity of deliveries but no significant short-run impacts on the quantity of antenatal care visits. The standard CDD model had no significant impact on the use of the project health facility, but also decreased the use of self-treatment and traditional healers.

Table VIII reports impact on immunization by children's age group. For each age group, we use information on how many times (doses) in total each child has received polio, DPT, BCG, and measles vaccines and vitamin A supplements. On the basis of the recommended immunization plan, we create indicator variables taking the value of 1 if child  $i$  of cohort (age)  $j$  had received the required dose(s) of measles, DPT, BCG, and polio vaccines, respectively, and 0 otherwise<sup>8</sup>. We then estimate equation (3), for each age group, and calculate average standardized effects.

The results in table VIII indicate that there was no significant impact of either intervention on immunization coverage. For the CDD + Information model, these long-run effects are in sharp contrast with the short-run impacts reported in Björkman and Svensson (2009) in which positive impacts on immunization coverage were reported for newborn children, children under 1 year, 1 year old and three year old children. The absence of long-run effects is likely explained by the fact that the World Health Organization and other UN agencies have worked intensively with the Ministry of Health in Uganda on large-scale and country-wide immunization campaigns during this period leading to a doubling of immunization rates in all areas (treatment and control) with coverage reaching 90-95%.

## 5.5. Health outcomes

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<sup>8</sup> According to the Uganda National Expanded Program on Immunization, each child in Uganda is supposed to be immunized against measles (one dose at nine months and two doses in case of an epidemic); DPT (three doses at six, ten, and fourteen weeks); BCG (one dose at birth or during the first contact with a health facility); and polio (three doses, or four if delivery takes place at the facility, at six, ten, and fourteen weeks). Because measles vaccination should not be given at birth, we exclude immunization against measles in the plan for infants under twelve months.

Ultimately, we are interested by assessing the impact of the two types of CDD intervention on actual health outcomes in the population of the catchment areas served by the health facilities. We collected data on births, pregnancies, stillbirths and measured the weight and height of children under age 5. Columns (i-iii) indicate that the CDD + Information model had a significant impact in reducing births and pregnancies and reducing the rate of stillbirths. No such impact is found for the standard CDD model.

Columns (iv) and (v) investigate the impact of the mortality rate of children under 2 and infant mortality (children less than 1 year old) respectively. The mortality rates are expressed per 1,000 live births. The CDD + Information model has a significant impact in reducing the mortality rate of children under age 2 and the infant mortality rate. The mortality reductions are also substantial in magnitude: an 18.4 reduction for under 2 mortality, with a mean of 54.3 in the control group and a reduction of 13.7 (statistically significant at the 10 percent) for infant mortality with a mean of 45.3 in the control group. There is no statistically significant impact for the standard CDD model.

Columns (vi-viii) of table IX look at the intervention impacts on anthropometric measurements of children. Columns (vi-vii) use the weight-for-age z-score for infants under 1 year of age as the dependent variables. The CDD + Information model has a positive impact on the weight-for-age z-cores, even when controlling for the child age in months and the child gender (column vii) and on the height-for-age z-score (column viii) for all children younger than age 5. The standard CDD model has no significant impact on the anthropometric outcomes of children, but it should be noted that the point estimates for the impact of both interventions are similar. The absence of statistical significance for the standard CDD model might be explained by the somewhat lower sample size available to evaluate that model.

For the CDD+Information model, the long term impact on health outcomes reported in table IX are consistent with the shorter-term impacts reported in Björkman and Svensson (2009): reduction in pregnancies (but not for births), similar improvements for weight-for-age z-scores (height-for-age z-scores not measured) and reduction in under-five mortality mainly driven by a reduction of mortality rates for children born in the last two years.

## **VI. Discussion and Conclusion**

This paper tries to push the research frontier on which elements are crucial for the success of CDD interventions by explicitly comparing two CDD models, one with and one without information dissemination. We do this comparison in a context, the health sector at the primary level in Uganda, which has been shown to be highly conducive to this kind of interventions. We can therefore be fairly confident that differences in outcomes should not be driven by context specific factors. Overall, the standard CDD project without any information provision did not have any effect on worker performance and on the quality of health care and ultimately on health outcomes in the population. In contrast, the CDD + Information project which combines information and participation showed significant improvements in both the quantity and the quality of health care delivery and on health outcomes in the long run.

Taken together, these results provide both encouraging and less encouraging news for the beneficiary control or CDD approach. On the one hand, they suggest that enhanced participation alone has little (or no) impact without changing the existing informational asymmetries. But, on the other hand they show that interventions that relax the beneficiaries' informational constraints and at the same time encourage community participation, can result in large and long run improvement in both health service provision and health outcomes. Going back to the principal-agent model framework outlined earlier, it seems that the informational asymmetry constraint is particularly important in order to solve the moral hazard problem. The community must be correctly informed about the standard of service provision and about the actual performance of their facility compared to that standard in order to set up a functioning plan to monitor the providers.

The CDD+Information model had large impacts on quality of care, utilization and health outcomes in the short run (Björkman and Svensson 2009). The magnitude of those impacts is probably due large x-inefficiencies (Leibenstein 1966) in the Uganda health sector. This paper finds that many of those impacts are sustained in the long run, even though communities received minimal support over time beyond the initial intervention. Anecdotal evidence from the field indicates that most treatment communities that participated in the first phase of the CDD+Information model were enthusiastic about the continuation of the process. They attributed the changes in the quality of health care at their health centers to the first phase of that

intervention. Indeed in several occasions community representatives brought their copies of the report cards and action plans from the phase 1 meetings to the new meeting on the assumption that they were going to be discussed in phase 2. Changes in attitudes among health facility staff was also observed and reported and staff responsible for health facilities (the “in-charge”) mentioned that the health facility meeting organized during the second phase of the CDD+Information model intervention was an excellent opportunity to discuss with the staff their performance and attitudes.

The number of randomized units was smaller (25 health facilities) for the standard CDD model than for the CDD+Information model (50 health facilities). One might be concerned that the lower statistical power implied for the evaluation of the standard CDD model explains the fact that significant impact was found for the CDD+Information model but not for the standard model. However, with the potential exception of the impacts on anthropometrical measurements in table IX (col. vi-viii), when the coefficients on the CDD+Information intervention are significant, the coefficients on the standard CDD intervention are generally of much lower magnitude and close to zero. Since we are measuring shorter term impacts for the standard CDD information (2 years) than for the CDD+Information model (4 years), another potential explanation for the different impacts of the two interventions would be if those interventions only show their full impact after more than 2 years. This is however unlikely given that, in general, the 4 years impact shown in this paper for the CDD+Information model are generally either of similar or somewhat lower magnitude than the 1 year effects reported in Björkman and Svensson (2009).

In many respects our standard CDD influenced participation intervention is similar both in design and in its lack of impact to the Banerjee et al. (2010) study on beneficiary control in Uttar Pradesh, India. In their study, trained facilitators held small-group discussions with parents. In these meeting, the facilitators encouraged discussion by raising questions, but did not provide any facts. The intervention culminated in a village meeting where the agent (the school teachers) was asked to provide general information about the provisions and resources available at the school or village level. In a second intervention, parents were provided simple reading and arithmetic tools to enable them to also generate their own information about their children’s

learning outcomes. This information was later shared in the village. However, no information was provided about what the clients are entitled to and neither was any quantitative and objective information provided about the performance of the school staff. While test scores are most likely highly correlated with the teachers' effort, it is plausible that parents would correctly infer that the variation in test scores are to a large extent driven by child and household specific factors, rather than teacher effort, and they might, possibly incorrectly, infer that the lack of resources are also a quantitatively important factor. Thus, even if parents view these scores as a credible and objective measure of their children's knowledge, they might thus be skeptical about using these test score estimates as an indicator of the school's performance, focusing instead on actions they can directly observe<sup>9</sup>.

Another intervention focusing on school performance in India provided information to parents on their oversight roles in local governance of schools and the education services they are entitled to, but did not include an additional community participation component. The evaluation results (Pandey, Goyal and Sundararaman 2011) show improved teacher performance, especially among teachers with permanent jobs who were used to high absenteeism rates, and improvements in mathematics test scores (but not in language studies).

Our study explicitly compares, in the same environment, a standard CDD model with an exclusive focus on community participation with a more elaborated model which combines enhanced community participation with the provision of information to relax informational asymmetries. Most CDD processes focus mainly the participation component. The comparison in our study is important because it allows us to identify the mechanisms at play in the CDD processes and what is required for them to have an impact.

An intervention that focuses on community participation is both technically much simpler and cheaper to implement. If enhanced participation was sufficient, there would be no need to spend a lot of effort and money in collecting and disseminating data to provide additional information to the communities about their rights and how their facility compares to the standard of care. However, our results indicate that community-based monitoring projects that focus on participation without providing quantitative information are much less likely to result in

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<sup>9</sup> This could explain, as reported in Banerjee et al. (2010), the observation that when people talked about education, it was rarely about learning. Instead, if anything got them excited it was the state government's scholarship program, or the new school-meals program. That is, observable actions or programs that villagers knew that the head-teacher or village head could directly control.

improved outcomes. If the information component is crucial, a relevant next step would be to experiment with ways to assemble and disseminate information cheaply, maybe using advances in information and communication technologies.

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