

Technical Proposal for Replication of “Power to the People: Evidence from a Randomized Field Experiment on Community-Based Monitoring in Uganda”

Submitted by Katherine Donato (PI) and Adrian Garcia Mosqueira (consultant)

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Abstract

Over the last few decades, reducing child mortality and improving health outcomes have been pressing objectives in sub-Saharan Africa and much of the developing world. While there are a wide range of potentially valuable interventions designed to combat these problems, there is mounting evidence that issues like absenteeism and leakage of public funds can significantly hinder the effectiveness of these interventions. Bjorkman and Svensson (2009) show that a relatively simple intervention – providing community-level health outcome information and guidance on community-based monitoring (CBM) – dramatically improved health outcomes, even rivaling some of the most effective health interventions to date. In this replication paper, we seek to verify the robustness of authors’ results through a pure replication, as well as to expand on their analysis in an effort to gain more insights into the mechanisms that allowed the CBM program to so effectively improve health outcomes.

Paper Choice and Motivating Questions

Seven million children under five died in 2011 alone, but this number could have been halved with better access to existing inexpensive and simple interventions.¹ While the total number of under-five deaths has steadily declined over the past two decades, the proportion preventable by these kinds of simple interventions remains stubbornly high.² The development literature often focuses on the introduction of medical treatments or external products to combat common causes of child mortality (including malaria, malnutrition, and pneumonia) with mixed results.³ While these types of interventions can certainly be effective, there is mounting evidence that issues like absenteeism of key public service employees, including teachers and health workers (e.g., Chaudhury et al., 2006), or leakage of public funds (e.g., Reinikka and Svensson, 2004) significantly influence health outcomes. This suggests that proper administration and oversight of health workers and existing resources may lead to more effective delivery of medical services, yielding subsequent improvements in health outcomes.

Using a randomized controlled trial in nine districts of Uganda, Bjorkman and Svensson (2009) show that a relatively simple intervention – providing community-level health outcome information and guidance on community-based monitoring (CBM) – dramatically improved health outcomes, even rivaling some of the most effective health interventions to date (see for example Jones, et al. 2003; Kidane & Morrow 2000). Over the course of three meetings, treatment communities were informed about their rights and entitlements from their local health services provider, as well data on local and regional provider performance. Each community was given a report card with quantitative measures of provider performance on key issues for each individual provider such as absenteeism and interactions with patients. These report cards also included performance comparisons between the local providers and other facilities, as well as the national standards for these healthcare measures. Using these community-specific parameters, local community members and service providers jointly developed an action plan designed to accountably monitor and address their health care service deficiencies.

¹ World Health Organization, 2013.

² World Bank, 2013.

³ For example Miguel & Kremer (2004) find that school wide introduction of deworming pills increased school attendance by one quarter. Cohen and Dupas (2010) find that women who were randomly assigned to receive free nets were more likely to use them relative to those that paid a subsidized price, making the free nets a more cost-effective, lifesaving intervention.

A year after the intervention took place, treatment communities saw significant improvements in primary care provision, utilization, and some health outcomes. Treatment facilities were significantly more likely have better organized and informative clinics, installing suggestion boxes, posters on patients' rights, and numbered waiting cards. As a result, treatment healthcare providers served more patients on average, absenteeism rates fell, and average patient waiting times fell, even with an increased caseload. More importantly, these improvements in service quality and utilization led to a 33% reduction in under-five mortality, a significant and very large effect, as well as moderate improvements in child age-for-weight z-scores.

Literature Contribution

Bjorkman and Svensson contribute to the growing literature on the importance of monitoring of public services and on community involvement in health service delivery. Olken (2007) provides an example of CBM and its impact on corruption reduction in Indonesia. Within the health context, there is evidence that community-based participation and mobilization interventions are vehicles to substantial and cost-effective reductions of child mortality, yet these are not commonly found in health systems in developing countries (Rosato, Mikey et al., 2008).

This paper is also influential in the literature on the importance of information dissemination in successful CBM interventions. Banerjee, et al. (2004) attribute lack of information as the key reason why their intervention on health worker monitoring in India had no positive results. In a later paper, Bjorkman, et al. (2014) reinforce the importance of the information aspect of CBM programs. Verification of Bjorkman and Svensson's results will lend credence to the importance of CBM in the academic literature and provide more motivation to expand this important approach in other contexts. On the other hand, challenges in verification of the results would suggest that we should be cautious moving forward with the approach and attempt to learn what dimensions could be altered to make it more effective.

Policy Relevance

The impressive health improvements outlined by Bjorkman and Svensson stem from the elimination of information gaps among health care service recipients. By closing these information gaps, community members were empowered to demand better health care services that improved health outcomes. The paper has already been widely influential in academic

circles, as can be seen by its numerous citations since it was published in 2009. The relative simplicity of the authors' intervention probably also makes these results especially appealing to policymakers with limited resources, underscoring the importance of exploring the robustness of these results before adopting them into broader contexts. Given that these issues are not unique to the Ugandan context and that many other countries in the developing world face similar administrative and oversight issues (Lindelov & Serneels, 2006), replication of the original authors' results are an important step in promoting or deciding to alter similar programs in the future.

CBM-style interventions are a relatively low-cost way to improve the quality of service in healthcare and other areas. In places like the United States, performance monitoring and administrative oversight is a worthwhile investment, even in light of existing high quality institutional infrastructure (Whole & Harrey, 1992). Issues such as corruption, absenteeism, poor adherence to clinical procedures, patient fee irregularities, and prescription drug leakages are pervasive in Uganda (McPake et al., 1999), resulting in weak health care services. This suggests that the returns to the monitoring of health service providers could be especially large in Uganda and other similar contexts. In the absence of robust institutions that can provide this oversight, the original authors successfully turn to CBM as a substitute.

Our main replication questions are designed to help policy makers determine whether to pursue community based monitoring in their own countries, and if so, what dimensions of the program to emphasize. To this end, in our replication of the original paper we feel it is especially important to establish pretreatment balance across treatment and control regions, to corroborate the dramatic health gains, and to understand why some treatment communities saw differential improvements.

Proposed Replication Plan

Pure Replication

Our replication begins by attempting to exactly reconstruct key results from the paper, while maintaining the definitions and assumptions set by the original authors. The replication will focus on verifying pretreatment balance, measurements of facility procedures changes, utilization, and objective health outcomes. We will also put significant emphasis on validating the original authors' robustness checks, particularly those that rule out alternative explanations of causality (this will be developed in more detail in the theory of change analysis).

Pretreatment Balance

Our focus on pretreatment balance is important in order to verify that randomization was successful on relevant observable characteristics, giving us more confidence that the analysis truly represents intervention effects and not pretreatment differences between comparison groups. We will verify pretreatment balance by replicating results in Table I around baseline characteristics of treatment and control communities, with a focus on the average standardized treatment effects that are perhaps the most opaque of these reported results (e.g., utilization pattern). Pretreatment balance is then further explored in the "Measurement and Analysis" section below.

Health Care Provision

The exact mechanisms through which CBM dramatically improved primary healthcare remain unclear. It is therefore important to validate observable measures of healthcare provision processes in treatment versus control facilities. This includes measures of overt changes within health facilities, such as posting information on patients' rights and rates of drug stock-outs. It will also be important to verify results surrounding healthcare workers' behavioral changes, including rates of absenteeism, as well as changes in clinical practice, including rates of using equipment during patient visits.

Robustness Checks

Similarly, given that the mechanisms between CBM and improved health outcomes are somewhat unclear, we will conduct a pure replication on the robustness checks presented by the authors (and further develop them in the "Theory of Change" analysis). In particular, we will

focus on their strategy to identify whether there are heterogeneous effects in response to different levels of CBM, using the methodology developed by Kling, Liebman, and Katz (2007). While the graphical results suggest that increasing intensities of CBM result in a larger impact on the population, we will follow Kling, Liebman, and Katz's lead and take an additional step and perform a test of overidentifying assumptions in order to be more confident that the data does indeed follow a linear model.

Health Outcomes

Finally, our pure replication will verify critical health outcome results of CBM , especially the 33% reduction in under-five mortality, 0.14 z-score increase in weight-for-age for infants, and immunization rate improvements. Given that the ultimate goal in implementing CBM is to improve health outcomes, it will be especially important to verify these results. Moreover, these seemingly extraordinary improvements are likely to draw policy makers to a similar intervention in many other settings, making proper methodological scrutiny a priority.

Measurement and Estimation Analysis

Pretreatment Balance

While the original authors show that there is pretreatment balance between the treatment and control communities on a number of facility- and community-level factors (which we will verify in the pure replication), they do not report on any pretreatment household-level characteristics across treatment versus control communities. Considering that the intervention's effects are thought to be driven by accountability and monitoring *from* the households, we feel it is especially important to verify that this pretreatment balance extends to the households. For example, one characteristic that will be important to check is the wealth of the households in each community. It is possible that the treatment group is relatively wealthy compared to the control group, and the differences in health outcomes like under-5 mortality are driven by wealth effects rather than the intervention. Considering that there are no (reported⁴) baseline measures

⁴ The most interesting health outcomes data are only collected at follow-up, though we will also explore pre-treatment balance on a limited number of health outcomes collected at baseline.

of health, it is very important to verify baseline balance on household characteristics that may have a significant impact on health.

Another domain of pretreatment balance that the authors do not report on is the characteristics of the community based organizations that facilitated the intervention in each community.⁵ It is important to verify that intervention effects are not being driven by differences in the CBOs by experimental group, including things like where the CBO leadership is from (e.g., local or not) or how long the CBO has been working in the community. The authors do report elsewhere that the 18 participating CBO's were active in 64% of the treatment and 50% of the control communities at baseline. Differences like this suggest pretreatment balance was not achieved on some important dimensions, and we will seek to rule out any relevant differences. (Note that a finding that there is not pretreatment balance on important CBO characteristics does not necessarily undermine the authors' findings. For example, it could be the case that treatment communities have more CBOs because they are relatively impoverished areas that need more help, in which case the dramatic health differences may actually be understated – also an important finding.)

Cost Effectiveness Analysis

The authors very briefly perform a back-of-the-envelope calculation of the cost-effectiveness of the CBM program by looking at the effects on under-five mortality. Their casual analysis unsurprisingly suggests that the program is highly cost-effective. Given the rising popularity of cost-effectiveness analysis and its use in health care decision making in countries around the world, it is very worthwhile to have more robust estimates of the program's cost-effectiveness that have been rigorously undertaken. Our focus will primarily be on the main health outcomes that were positively impacted and that have been previously analyzed in other contexts so that there will be meaningful comparisons. These outcomes include the reduction in under-five mortality and increases in immunization rates and weight-for-age z-scores.

⁵ Note that as of submission of this replication plan, we are not certain as to whether or not we will have access to this data.

Theory of Change

Assuming that the original authors' evidence is robust, the mechanisms that turned the CBM into dramatic health gains remain unclear. As the original authors acknowledge, what happens in between is somewhat of a black box. In this section we describe some additional estimation strategies that will help to better understand what is inside that black box – and how relevant the CBM intervention was and for what groups.

Immunization

The original authors do a thorough job analyzing the effects of the CBM program on immunization, breaking the results down by whether each child under five received the age-appropriate prescribed immunizations, and by looking at the effects on specific age groups within the under-five range on receipt of the four relevant immunizations and Vitamin A supplements. As expected, the results for measles, (the only vaccine recommended at nine months and also the last recommended childhood vaccine) show the poorest effects in these specifications. This is likely driven by the fact that some mothers are not completing the full immunization schedule for their children.

Ideally, a CBM program would help all age groups obtain all missed immunizations, but the results are not especially promising for children 12 months or older at the time of the intervention. There is a peculiar spike in effects on immunizations for three year olds that we plan to further explore. One possible explanation is that health workers are, as a result of the CBM, more proactive about ensuring all children are being properly immunized, but only among those that attend health centers (i.e., health workers are not focusing on community outreach). We hypothesize that during the intervention, mothers brought their older children along when immunizing a younger sibling, resulting in greater immunization coverage of these older children. If we find that older children are more likely to have all the proper immunizations conditional on having a younger sibling who was also immunized, this could suggest that immunization benefits were driven by a “proactive health worker within the health center” effect, and less so by increased community outreach. Given the emphasis in Uganda and many other developing countries with large rural populations on community outreach by health workers, it is important to understand how this CBM program affected those efforts.

CBO Characteristics⁶

Because the intervention was carried out by 18 different local CBOs around Uganda, 40 percent of whom were not operating in Uganda prior to the intervention, it is likely that there are characteristics unique to each of the CBO's that make them differentially effective. If other policy makers wish to implement a similar CBM program in their own countries, understanding of these differences is especially important. Therefore, instead of simply considering outcomes between treatment and control areas, we also plan to look further within the treatment group to see if it is possible to tease out what makes some regions differentially successful at making health improvements. This will focus on three to four of the main health outcomes, including under-five mortality, children's weight-for-age, and health facility utilization. While we consider this an important element to explore, we are aware that the CBO sample size might not be sufficient to detect statistical differences between these CBOs, if they do indeed exist. As part of this analysis, we plan to rerun power calculations to see if it would be reasonable to detect significant differences based on CBO characteristics.

Community Action Plan Characteristics⁷

As part of the intervention, community members and health workers came up with jointly agreed upon community action plans. These generally included what health issues or services were most important to address, what could be done, who should be doing it, by when, and how the community would monitor what was happening. These action plans are presumably key to the effectiveness of the intervention, so it is worth pursuing further what aspects of the community plans were most influential in seeing positive health benefits. For example, it might be the case that publicly posting when the health workers should be on duty at the health centers (to reduce absenteeism) is a really effective mechanism for inducing better behavior on the part of the health workers. Or it could be that health workers respond adversely to these kinds of "sticks" and better results would be achieved with "carrot" incentives. Right now we only have access to one example action plan so we cannot form really specific hypotheses about what

⁶ Note that as of submission of this replication plan, we are not certain as to whether or not we will have access to this data.

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works better or worse, but we are hoping to explore this dimension further with the goal of better informing future CBM interventions.

Process Measures – Technology, Management, or Both?

As mentioned above, the intervention’s policy usefulness is somewhat diminished by the “black box” nature of going from the intervention to improvements in health. As a result, we plan to carefully examine the program’s impact on health facilities’ treatment practices and management to get a better sense of the process by which these improvements occurred. The management changes, generally around personnel issues and effort, appear fairly strong and our analysis of them will not extend beyond pure replication (discussed above).

We think, however, that it is instructive to more carefully consider the one reported process measure, which is related to the technological quality of care provided: whether or not any equipment like a thermometer was used. Of the three specifications reported on this outcome in the paper and online appendix, only one shows a significant positive program impact. We would like to break this down and see if the reported program impact is being driven by the use of any one particular piece or type of equipment and if there are different program effects on different types of equipment that the providers may use. Getting a better sense of what changes that are occurring are the result of better utilization of technical clinical skills versus simply treating patients better and managing the facility well will help us understand better what is driving the health improvements. For example, if we find that treatment facilities are not really making any better use of their clinical skills, this is an area that future interventions should focus on since health could likely be improved even more if providers are making appropriate use of available health technologies.

Weight-for-age z-scores

In some cases, our expansion of the original authors’ results are geared towards gaining a more precise understanding of where program are effects are greatest rather than altering assumptions that they have made. For example, in measuring the program impact on infants’ weight-for-age z-scores, the authors report a simple regression coefficient as well as an empirical cumulative density. In order to get a more precise measure of where programs impact is strongest, we plan to replicate this analysis using a more robust (i.e., non-parametric) kernel

density estimation approach that will allow us to more specifically isolate what age ranges are benefiting most.

Moreover, we plan to combine this analysis with the immunization results to get a better understanding of whether the weight results are driven by more frequent health center visits. According to Uganda Ministry of Health guidelines, babies should receive immunizations on five different occasions by the time they are nine months old. If babies that do not receive the proper immunization schedule are on par weight-wise with their peers who do get the proper immunizations, this suggests alternative mechanisms for improved weight-for-age other than frequent health center visits (e.g., better antenatal care, better health education for the mother). Again, the goal is to get a more precise understanding of exactly what levers have been pushed in order to see the dramatic health benefits that resulted from this intervention.

Conclusion

Bjorkman and Svensson's "Power to the People" presents the exciting results of a health intervention with impressive health outcomes improvements. It is important for academics and policy-makers alike to know if the results are robust through replication. Health ministries in developing countries remain woefully underfunded, and it is important to allocate their budgets to programs that have the greatest chance of improving health. If these results are robust, it will be cause for even more excitement and will hopefully provide a greater impetus for other countries to begin adopting similar programs, or restructuring existing CBMs to implement features of Bjorkman and Svensson's design that might improve them.

It is, of course, important to note that even if the results are shown to be robust through our replication, there is still likely much work to be done. Miguel and Kremer (2007) find that it is difficult to sustain a one-time intervention that provides a public good, and community based monitoring falls squarely into that category. More specifically, Olken (2007) finds that it is difficult to sustain grassroots monitoring because of free-rider problems. If the original authors' results are validated, next steps will include evaluating how effective the program is in the long term. In particular, do community members continue to vigorously monitor and hold the health workers accountable? And if they do maintain their enthusiasm, do the health workers continue to respond to community monitoring over time? Answering these crucial questions is beyond the

scope of this replication, but it will be necessary before community-based monitoring can be fully judged a success.

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