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Zambia's Child Grant Program: Baseline Report

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Executive Summary

In 2010, Zambia's Ministry of Community Development and Social Services (MCDSS) began implementing the Child Grant cash transfer program (CGP) in three districts. An impact evaluation with experimental design accompanied the program in order to learn its effects on recipients and provide evidence for making decisions about the future of the program. The American Institutes for Research (AIR) was contracted by UNICEF Zambia in 2010 to design and implement a randomized controlled trial (RCT) for a three-year impact evaluation of the program and to conduct the necessary data collection, analysis, and reporting.[1]

The primary goals of this baseline report are to describe the sample developed for the evaluation and the approach to random assignment, assess targeting, check for equivalence between the treatment and control groups, and estimate potential effects of the program on outcomes by using statistical models that link outcomes to income and other factors. Predicting programmatic effects in advance introduces an extra level of the scientific method to the study by stating up front the hypothesized results, a characteristic not typically conducted in cash transfer studies but something that ideally would accompany any baseline report. These goals are briefly summarized here and expanded on in the full report.

The Program: The CGP targets any household with a child under five years old. Eligible households receive 55,000 kwacha a month (equivalent to U.S. $11) irrespective of household size, an amount deemed sufficient to purchase one meal a day for everyone in the household for one month. According to the MCDSS, the goal of the CGP is to reduce extreme poverty and the intergenerational transfer of poverty. The objectives of the program (as specified in the child grant manual)) are to (1) supplement and not replace household income; (2) increase the number of children enrolled in and attending primary school; (3) reduce the rate of mortality and morbidity among children under 5 years old; (4) reduce stunting and wasting among children under 5 years old; (5) increase the number of households owning assets such as livestock; and (6) increase the number of households that have a second meal a day. The MCDSS started the rollout of the CGP in Kalabo, Kaputa, and Shongombo, the three districts with the highest rates of mortality, morbidity, stunting, and wasting among children under 5. This introduces an element of geographical targeting to the program.

The Sample: We have collected a randomly selected, representative sample of sufficient size to conduct this evaluation. The sample is unique for cash transfer evaluations in Africa because it contains a large number of children ages 5 and under, enabling us to more readily detect small effects of the program among this age group. There are 2,515 households in the study, with 14,565 people; this number includes 4,793 children ages 5 and under, with the largest number under 1 year old (1,427). Among the recipients, 99 percent are women, 25 percent of whom never attended school. The program aims to assist extremely vulnerable households with children. The program appears to have met this goal because over 23 percent of children 6 to 18 years old in the study do not own a pair of shoes, a blanket, or a change of clothing; only 11 percent of the sample have all three items.

[1] Palm Associates was contracted by AIR to assist with the baseline data collection.

Targeting and Comparison to National Samples: Poverty rates are higher in the three program districts than the national average, and the results presented here indicate that CGP-eligible households are even poorer than other households in these districts. Among individuals in our sample, 95 percent fall below the extreme poverty line versus 85 percent in the most comparable Living Conditions and Monitoring Survey (LCMS) sample in these districts and 69 percent in a sample that includes all rural areas across the country. Self-assessed well-being measures and food security indicator are consistent with this result—CGP-eligible households are more food insecure and report lower welfare levels than their counterparts in the LCMS. Targeting in the CGP is highly progressive because the most vulnerable households are overrepresented among the eligible recipients. This result is due to the geographical targeting approach that focuses on districts with the highest rates of vulnerability. Finally, on all child welfare indicators except one (stunting among children over 2 years of age), we find CGP-eligible children to be significantly worse off than the all-Zambia average, using the Zambia Demographic and Health Survey (ZDHS). Thus, on both poverty and human development metrics, the targeting strategy in the CGP is highly progressive.

Access to Healthcare: Improving health, especially for children under five years old, is one of the primary goals of the CGP. We investigated baseline access to healthcare facilities for our sample and found that households lack access to important services and medicines. There are 31 health facilities serving the 80 Community Welfare Assistance Committees (CWACs) in our sample; however, only 12 of these facilities are Rural Health Clinics (RHCs) with regular trained, on-site staff. The median distance to the nearest health facility is 7 km one way, roughly a three-hour walk round-trip. Ten percent of households live over 20 km away from the nearest health facility. Less than 10 percent of the health facilities use a protected water source, only 13 percent have access to a vehicle even though much of the population they serve is located in far-reaching rural areas, and only 35 percent offer malaria testing, the biggest cause of death in Zambia for children under five years old. These facilities lack sufficient medical supplies, with less than 33 percent stocking malaria drugs, less than half stocking oral rehydration salts (ORS), and less than half stocking insecticide-treated malaria nets at time of survey.

Randomization: We compared the treatment and control groups at baseline to assess equivalence along outcome and control indicators. Randomization appears to have worked; only a few indicators are statistically different between groups, and the differences are not large enough to be meaningful. We expect some differences as a result of chance owing to the large number of statistical tests we use to assess equivalence (more than 60), especially given the relatively large size of the samples. The differences that we do find will be controlled for during analysis when we estimate impacts.

Transfer Size: The program provides Kw 55,000 per month, which translates to Kw 11,000 per capita per month because the median family size is five. This study shows that mean per capita expenditure in recipient households before the transfer is Kw 40,750 per person per month. Thus, the 11,000 kwacha monthly per capital transfer is a 27 percent increase to the household's monthly expenditure. This is a meaningful increase to recipients considering that 95 percent of CGP households fall below the national extreme poverty line compared to 69 percent of all rural households with children under five years old in the Zambia Living Conditions and Monitoring Survey (LCMS). The CGP transfer level is comparable to

those from some of the world's most successful programs such as *Oportunidades* in Mexico and *Familias* in Colombia.

Predicted Program Effects: Our prediction of program effects indicate that the CGP is likely to have positive and statistically significant impacts on first order and second order indicators. We estimate significant increases in the number of meals per day and the FANTA food security score. We predict that 78 percent of the CGP transfer will go to food spending, seven percent to fuel and five percent to health. Within food, we estimate that 34 percent of the increased spending on food will go to cereals, 24 percent to meats and 18 percent to fruits and vegetables. We expect that the CGP will have important impacts on diet diversity and food security of eligible recipients. Predicted second order effects, those on child outcomes, are smaller but most are also statistically significant, the main exceptions being nutritional status (HAZ and WAZ). However for many other indicators, including several ECD domains, infant and young child feeding, and material welfare and school attendance of older children, we predict statistically significant impacts of the program.

I. Introduction

This report provides the baseline results of the Child Grant cash transfer impact evaluation. In 2010, Zambia's Ministry of Community Development and Social Services (MCDSS) began implementing the Child Grant cash transfer program (CGP) in three districts. An impact evaluation with experimental design accompanied the program in order to learn its effects on recipients and provide evidence for making decisions about the future of the program. The American Institutes for Research (AIR) was contracted by UNICEF Zambia in 2010 to design and implement a randomized controlled trial (RCT) for a three-year impact evaluation of the program and to conduct the necessary data collection, analysis, and reporting.[2] This report contains the findings from AIR's work and is presented in eight sections: Introduction, Conceptual Framework, Study Design, Survey Instruments, Sample, Targeting Analysis, Predictions of Program Impacts, and Limitations and Conclusion.

Background

In 2010, Zambia's MCDSS started the rollout of the CGP in three districts: Kalabo, Kaputa, and Shongombo. Zambia had been implementing cash transfer programs since 2004 in four districts, trying different targeting models in each district. The government decided to introduce a new model, the CGP, in three new districts that had never received any cash transfer program. This categorical model targets any household with a child under 5 years old. Recipient households receive 55,000 kwacha (Kw) a month (equivalent to U.S. $11), an amount deemed sufficient to purchase one meal a day for everyone in the household for one month. The amount is the same regardless of household size. Payments are made every other month through a local paypoint manager, and there are no conditions to receive the money.

Locations

The MCDSS chose to start the CGP in the three districts within Zambia that have the highest rates of mortality, morbidity, stunting, and wasting among children under 5, thus introducing an element of geographical targeting to the program. The three districts are Kaputa, located in Northern Province; Shongombo, located in Western Province; and Kalabo, also located in Western Province. All three districts are near the Zambian border with either the Democratic Republic of Congo (Kaputa) or Angola (Shongombo and Kalabo) and require a minimum of two days of travel by car to reach from the capital, Lusaka. Because Shongombo and Kalabo are cut off from Lusaka by a flood plain that turns into a river in the rainy season, they can be reached only by boat during some months of the year. These districts represent some of the most remote locations in Zambia, making them a challenge for providing support services, and are some of the most underprivileged communities in Zambia.

Enrollment

Only households with children under three years old were enrolled in the program to ensure that every recipient household receives the transfers for at least two years. This means that the baseline sample includes only households with a child under 3.[3] The ministry will implement a continuous enrollment

[2] Palm Associates was contracted by AIR to assist with the baseline data collection.
[3] There are 50 households with no child under 37 months and 15 households without a child under 49 months in the evaluation sample.

system in which households are immediately enrolled after having a newborn baby. Thus, every household in the district with a child under five years old will receive benefits for two years after the program is introduced to that area.

Objectives

According to the MCDSS, the goal of the CGP is to reduce extreme poverty and the intergenerational transfer of poverty. The objectives of the program relate to five primary areas: income, education, health, food security, and livelihoods. Therefore, the impact evaluation will primarily focus on assessing change in these areas. The objectives of the program follow (in no specific order):

1. Supplement and not replace household income
2. Increase the number of children enrolled in and attending primary school
3. Reduce the rate of mortality and morbidity of children under 5
4. Reduce stunting and wasting among children under 5
5. Increase the number of households having a second meal per day
6. Increase the number of households owning assets such as livestock

II. Conceptual Framework

The CGP provides an unconditional cash transfer to households with a child under age 5. As we demonstrate later in this report, CGP-eligible households are extremely poor, with 95 percent falling below the national extreme poverty line and having a median household per capita daily consumption of Kw 1050, or approximately 20 U.S. cents. Among households at such low levels of consumption, the marginal propensity to consume will be almost 100 percent. Thus, we expect the immediate impact of the program will be to raise spending levels, particularly basic spending needs for food, clothing, and shelter, some of which will influence children's health, nutrition, and material well-being. Once immediate basic needs are met, and possibly after a period of time, the influx of new cash may then trigger further responses within the household economy, for example, by providing room for investment and other productive activity, the use of services, and the ability to free up older children to attend school.

Figure 2.1 brings together these ideas into a conceptual framework that shows how the CGP can affect household activity, the causal pathways involved, and the potential moderator and mediator factors. The diagram is read from left to right. We expect a direct effect of the cash transfer on household consumption (food security, material well-being), on the use of services, and possibly even on productive activity after some time. Sociological and economic theories of human behavior suggest that the impact of the cash may work through several mechanisms (mediators), including a woman's bargaining power within the household (because the woman receives the cash directly) and the degree to which the woman is forward looking. Similarly, the impact of the cash transfer may be weaker or stronger depending on local conditions in the community. These moderators include access to markets and other services, prices, and shocks. Moderating effects are shown with dotted lines that intersect with the solid lines to indicate that they can influence the strength of the direct effect.

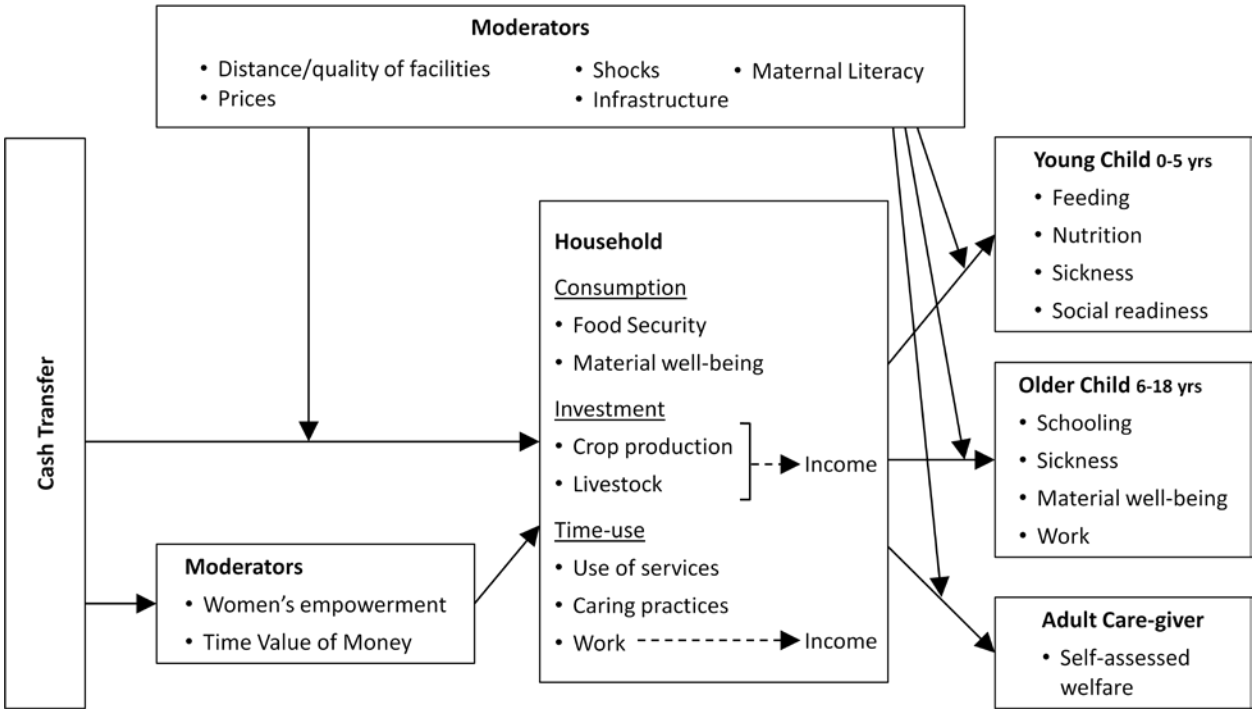
The next step in the causal chain is the effect on children, which we separate into older and younger children because of the program's focus on very young children and because the key indicators of welfare are different for the two age groups. It is important to recognize that any potential impact of the program on children must work through the household through spending or time allocation decisions (including use of services). The link between the household and children can also be moderated by environmental factors, such as distance to schools or health facilities, as indicated in the diagram, and household-level characteristics themselves, such as the mother's literacy. Indeed, from a theoretical perspective, some factors cited as mediators may actually be moderators, such as women's bargaining power. We can test for moderation versus mediation through established statistical techniques,[4] and this information will be important to help us understand the actual impact of the program on behavior.[5]

4 Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182.

[5] A mediator is a factor that can be influenced by the program and so lies directly within the causal chain. A moderator, in contrast, is not influenced by the program. Thus, service availability is a moderator, whereas women's bargaining power may be either a moderator or a mediator depending on whether it is itself changed by

In Figure 1, we list some of the key indicators along the causal chain that we will analyze in the evaluation of the CGP. These are consistent with the long frame of the project and, as described more fully in Section 4, are all measured using established items in existing national sample surveys such as the Living Conditions Monitoring Survey (LCMS) and the Zambia Demographic and Health Survey (ZDHS). The only exception is the school readiness indicator, which is a relatively new index developed by UNICEF to be rolled out as part of its global Multiple Indicators Cluster Surveys (MICS) Program.

Figure 1. Conceptual Framework for Impact Evaluation of Child Grant Program



the program. Maternal literacy is a moderator and not a program outcome, unless the program inspires caregivers to learn to read and write.

III. Study Design

The CGP impact evaluation relies on a randomized design to estimate the effects of the program on recipients. Communities designated by Community Welfare Assistance Committees (CWACs) were randomly assigned to either the treatment condition to start the program in December 2010 or to the delayed control condition to start the program at the end of 2013.

The MCDSS decided to implement a randomly assigned delayed control group because it did not have sufficient resources or capacity to deliver the program to all eligible households immediately. Thus, the Ministry instituted a policy of randomly assigning communities to current or delayed treatment, deeming it to be the most ethical and fair way to select the order in which communities receive the resources as they became available (see Appendix A for a Ministry statement of the official policy). This section reviews the benefits of randomized controlled trials (RCTs) for estimating program impacts. We then discuss the randomization processes, including selection, sampling, and assignment; the timing and process of data collection; and data entry.

Benefits of Randomization

The CGP impact study is an RCT with random assignment at the community level (CWAC). An RCT is the most powerful research design for drawing conclusions about the impacts of an intervention on specific outcomes. An RCT draws from a pool of subjects that are believed to be comparable and then randomly assigns some to a treatment group that receives the intervention and others to a control group against which comparisons of outcomes can be made. An RCT permits us to directly attribute any observed differences between the treatment and control groups to the intervention; otherwise, other unobserved factors, such as motivation, could have influenced members of a group to move into treatment or control group.[6] Randomization is used to balance the observed and unobserved characteristics that affect the outcomes between the treatment and control conditions of the sample. In a randomized experiment, treatment and control groups are expected to be comparable (with possible chance variation between groups) so that the average differences in outcome between the two groups at the end of the study can be attributed to the intervention.

Randomization Processes

This study includes several levels of random selection, including CWACs within districts and households within CWACs. It is a multisite RCT because random assignment of CWACs occurs within each of the three districts. The Ministry conducted the first step of the randomization process by selecting and ordering 30 CWACs within each district (out of roughly 100 CWACs in each district) through a lottery held at the Ministry headquarters in June 2010 with Ministry staff from the three districts participating. This process created transparency and understanding about how the communities were selected for everyone involved in implementing the program. After the 90 CWACs were randomly selected (30 from each district) for the study, CWAC members and Ministry staff identified all eligible households with at least one child under 3 years old in the study communities. This process resulted in more than 100

[6] Campbell, D. T. & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Hopewell, NJ: Houghton Mifflin.

eligible households in each CWAC; 28 households were then randomly sampled from each CWAC for inclusion in the study (see Appendix B for a detailed description of the random sampling procedure).[7] Baseline data were collected for the 28 randomly sampled households in each randomly selected CWAC in each district (30 CWACs per district) and located in one of the three geographically targeted districts. The final study sample size was more than 2,500 households.

The baseline data collection began before CWACs were randomly assigned to treatment or control conditions. Neither the households nor the enumerators knew who would benefit now and who would have to wait. Random assignment occurred after the baseline data collection was complete, with the Ministry's Permanent Secretary flipping a coin to determine whether the first half of the list of randomly selected CWACs would be in the treatment or the delayed control condition. This process was conducted in public with local officials, Ministry staff, and community members present as witnesses.

Timing and Process of Baseline Data Collection

To ensure high-quality and valid data, special attention was paid to the process and timing of data collection, making sure that it was culturally appropriate, sensitive to Zambia's economic cycle, and consistently implemented. AIR contracted with Palm Associates, a Zambian research firm with years of experience conducting household surveys throughout Zambia, to help implement the CGP survey and enter the data. A team of Zambian enumerators experienced in household and community surveys and fluent in the local language where they worked were trained on the CGP instrument and then tested in the field before moving into their assigned communities for data collection. One enumerator collected data in each household, interviewing the identified potential female recipient and documenting her answers. This oral interview process was necessary because many of the recipients are illiterate. In addition to interviewing the female head of household, the enumerator collected anthropometric measures (height and weight) for every child age 5 or under, using high-quality height boards and scales endorsed by UNICEF. Enumerators were trained in proper anthropometric measuring techniques and then supervised in the field by specialists from Zambia's National Nutrition Council. In addition to the household survey, a community questionnaire was administered in every CWAC by two senior enumerators to a group of community leaders including CWAC committee members, teachers, village headmen, and local business owners. Last, a senior member on the enumerator team administered a health facility questionnaire for each CWAC to the staff of the nearest health facility.

Baseline data collection occurred in Zambia's lean season (September through February), when people have the least amount of food left from the previous harvest and hunger is at its greatest. Zambia has three seasons, a rainy season from December through March, a cold dry season from April through August, and a hot dry season from September through November. Crops are planted in the rainy season and harvested throughout the rainy season and into May. Food is most scarce toward the end of the hot dry season (October and November) because this is the longest period without a food harvest. The CGP aims to support poor households during this period of hunger by providing enough money to purchase a

[7] The sample size was determined through a power analysis to ensure that the study was able to detect meaningful effects. The 28 households per CWAC and 30 CWACs per district result from this power analysis.

meal a day. We believe that the biggest impacts of the program are likely to be observed during this lean season; thus, the study is designed with baseline and follow-up periods of data collection during this season.

Baseline data collection in the three districts occurred within a few weeks of each other. Data were collected in Kaputa in early October to avoid the rains that begin earlier there than in the rest of the country. We also wanted to avoid the 2010 Zambian census data collection, scheduled to take place in mid October. Date collection started a bit later in Kalabo and Shongombo, with interviews commencing in late October, after the census was completed in these districts but before the rains began. Overall, data collection went smoothly, with all selected households voluntarily participating.

Data Entry

Palm Associates entered the data as they came in from the field. Data were verified using double entry on separate computers, flagging inconsistent responses between the two entries, and referring to the original questionnaire to see the actual response.

IV. Survey Instrument

Three survey instruments were used in the quantitative impact evaluation of the CGP—household questionnaire, community questionnaire, and health facility questionnaire. The core instrument is the household questionnaire, which is very similar in layout and coverage to two major multitopic national surveys in Zambia, the Living Conditions and Monitoring Survey (LCMS) and the Zambia Demographic and Health Survey (ZDHS). The guiding principles behind the design of the household questionnaire are described in a background note[8] submitted to UNICEF and the MCDSS. Preliminary drafts of the questionnaire were discussed at a meeting in Lusaka that involved representation from six Ministries.[9] The design of the household instrument was guided by three core principles:

- First, the instrument must contain the key list of indicators presented in the project's log frame that will allow the program to be assessed against its stated objectives. These core indicators include monetary poverty, food security, school enrollment and absenteeism, morbidity, and child nutritional status (although the final instrument contains many more relevant indicators).
- Second, where possible, indicators are measured using the questions and approaches that have already been field tested and approved by Government and Cooperating Partners in Zambia. Thus, for all the key indicators measured in the study, we employ questions from either the ZDHS or the LCMS, thus ensuring that they are appropriate for local conditions and that the resulting data can be compared with national data.
- Finally, the survey instrument must be a manageable length to avoid interviewer or respondent fatigue. The final instrument is 40 pages long and takes approximately 90 minutes to complete. Table 4.1 provides a list of topics covered in each of the three instruments.

Beyond these three core principles, and consistent with international best practice in program evaluation, the instruments collected sufficient information along the causal chain to allow us to understand *how* the program influences behavior. This is in contrast to more naïve evaluations that look only at *whether* a program has had an impact by focusing exclusively on final outcomes. By looking at the entire causal chain, we were able to understand how the program influences behavior, even when final outcome or impact indicators are not influenced by the program. Because the program provides cash, and because savings rates among this very poor population are likely to be very low, the initial and direct impact of the program will be to influence spending and household expenditures. Expenditure, therefore, is a key *mediating variable* for subsequent child development impacts (see Figure 2.1, Conceptual Framework). We have thus included the full expenditure module of the LCMS in our household survey, which covers 217 separate expenditure items across both food and nonfood categories. Moreover, by simultaneously fielding community and health facility questionnaires, we can capture characteristics of the local environment that can act as important *moderators* of program impacts. For example, the program may have stronger impacts on child health in locations where health

[8] American Institutes for Reasearch. (2010). *Baseline survey instrument for quantitative evaluation household survey* (background note submitted to UNICEF and MCDSS, Lusaka, July 2010): Washington, DC: Author.
[9] A written summary of this meeting was compiled by AIR and is available upon request.

facilities are better, or the impacts on diet diversity and food security may be larger when markets are more accessible so that cash can be easily spent.

Table 4.1: Topics in Survey Questionnaires

Household Survey (N=2519)	Community Survey (N=80)
Roster and Orphans and Vulnerable Children (OVC) Status — All	Migration
Health — All	CWAC Profile and Governance
Education — 3+ years	Agricultural Prices
Main Economic Activity — 5+ years	Existence of Other Programs and Groups
Income — 16+ years	External Shocks
Household Assets	Wage Rates
Housing Conditions	Prices of Food
Access to Facilities	Health Facility Questionnaire (N=41)
Agriculture and Livestock	Basic Characteristics and Equipment
Self-Assessed Poverty and Food Security	Services Provided
Women's Empowerment and Expectations	Drugs Available
Mortality	Personnel
Child Health and Development	
Fertility	
Expenditure	

V. Sample

This section reports the mean differences at baseline for primary outcomes and mediating variables between the treatment group and the control group on the household survey. We also describe the sample for the study, breaking it up into four categories: household demographics, recipients, children, and expenditures. The primary purpose of the baseline data collection was to measure the starting point for everyone in the sample and check that the treatment and control conditions were balanced before the start of the intervention. In theory, randomization should lead to a balance for outcome and control indicators between the two conditions, but this may not always happen.[10] Therefore, we measured each group at baseline and tested for differences to determine whether randomization led to a balanced sample.

Treatment and Control Comparisons

Randomization appears to have worked in terms of creating equivalent groups at baseline because the means characteristics of groups were balanced between the treatment and control groups. We tested all the outcome measures and control variables for statistical differences between the two groups, using t-tests of differences in means across groups. Twelve of the 61 indicators were statistically significantly different at the 5 percent alpha level; however, none of these 11 differences was meaningful because they represent very small standard deviations (SD) differences (Table 5.1). Also, we would expect at least three significant differences in comparing 61 indicators from otherwise equivalent groups as a result of sampling error.[11] The sample size in this study is quite large, with more than 2,500 households, more than 5,000 children ages 5 and under, and more than 5,000 children between the ages of 6 and 18; thus, we have power to detect very small and substantively meaningless differences. See Appendix Z for the complete t-test results on all 61 indicators.

Table 5.1: Baseline Differences between Treatment and Control Groups

Outcome variables	Control	N1	Treatment	N2	Mean Difference	Mean Difference in SD
Child Health Card	0.93	2171	0.95	2034	-0.02**	0.07
Vitamin A dose in the last 6 months	0.76	1846	0.79	1757	-0.03*	0.06
Diarrhea in the past 2 weeks	0.17	2177	0.20	2039	-0.03*	0.08
Highest grade level completed by primary caregiver?	3.69	2478	4.13	2314	-0.44**	0.13
Mneed	0.77	2290	0.80	2301	-0.03*	0.07
Paid or unpaid work	0.56	2239	0.59	2265	-0.03*	0.06
No. unpaid hrs last 2 weeks	23.36	1218	21.33	1319	2.03*	0.09
Cereal share	0.31	1287	0.34	1224	-0.04**	0.15
Roots/tubers share	0.17	1287	0.15	1224	0.02*	0.08
Fruits/vegetables share	0.23	1287	0.21	1224	0.02*	0.09
Household was affected by flood	0.07	1287	0.03	1228	0.04**	0.15

[10] Campbell, D. T. & Stanley, J. C. (1963). *Experimental and quasi-experimental designs for research*. Hopewell, NJ: Houghton Mifflin.

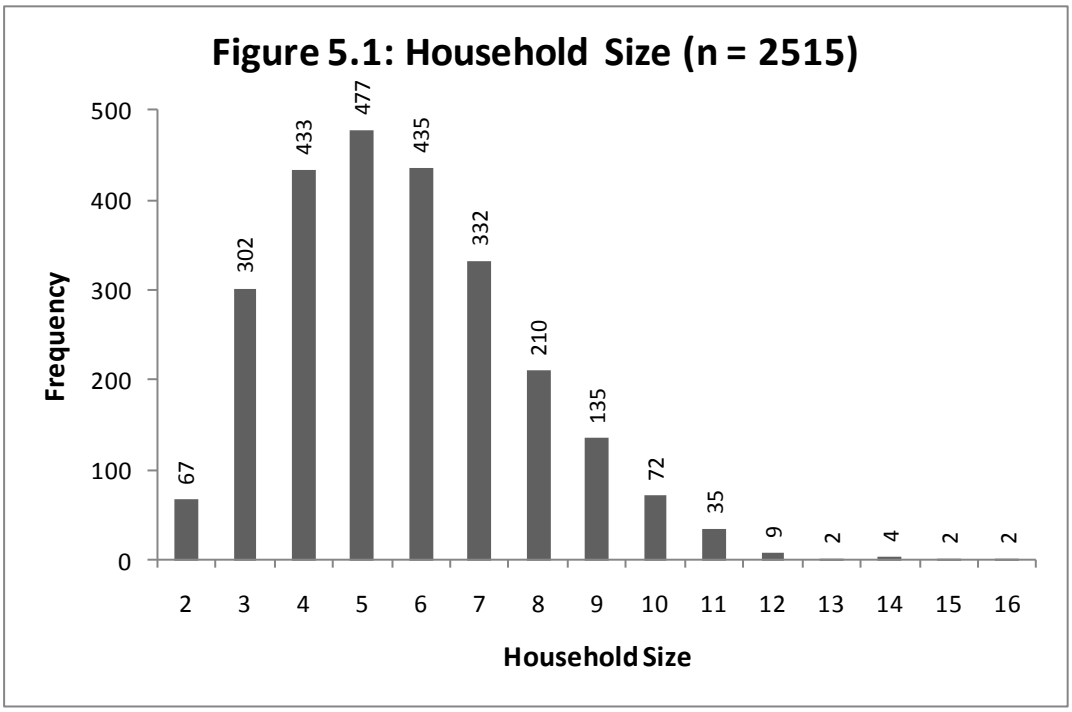
[11] Alpha level is set to 0.05, meaning we expect to observe a false positive 5 percent of the time. With 60+ tests, we should have at least three spurious results, but we are unable to say which three are incorrect.

The Sample

Besides checking for statistical equivalence between groups, the baseline provides a snapshot of the lifestyle, well-being, and family of potential recipients before they start receiving the cash transfers. We present this picture by describing the entire sample with the treatment and control groups combined because the two groups are statistically similar and both represent eligible recipients for the program. Members of neither group knew their status as treatment or delayed control during baseline data collection so that their responses would not be influenced by anticipation effects. We describe the sample as four components that relate to the goals of the program: demographics, recipients (female head of household), children, and household expenditures.

Demographics

The sample contains 2,515 households with 1,228 in the treatment group and 1,287 in the control group. In total, 14,565 people live in the households in the study. The median household has 5 people with an SD of 2.11 for the average household size of 5.70 people. Figure 5.1 depicts the distribution of households by size.



Almost one-third (4,793) of the sampled individuals are children under age 5, making the study unique for cash transfer evaluations in Africa—the sample has the largest proportion of children in this age range. This demographic distribution results for two reasons. First, a household must have at least one child underage 3 to be eligible for enrollment into the program and be included in the study.[12] Second, according to the ZDHS, women in rural areas average seven births with roughly two years of spacing between births. Thus, every household has at least one child under age 3 who is likely to have at least

[12] The household remains in the program as long as they have at least one child under age 5.

one sibling who is under five years old. Table 5.2 and Figure 5.2 break down the sample by age and gender. The sample includes very few people over 69 years old. This result is not surprising because the program targets households with young children and aims to assist young mothers and children. As expected, on average, there are almost two children under age 5 per household.

Table 5.2: Age by Gender

Age	Male	Female	per Household	Total
0 to 5	2437	2356	1.90	4793
6 to 18	2269	2322	1.82	4591
19 to 69	2247	2863	1.94	5110
70+	27	44	0.03	71

Figure 5.2: Male and Female Population by Age

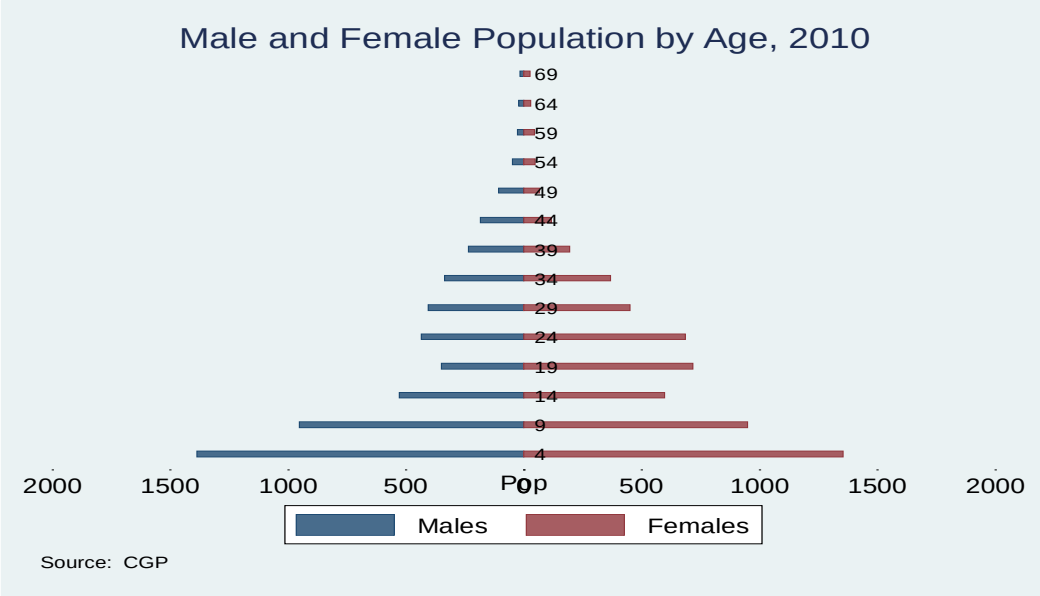
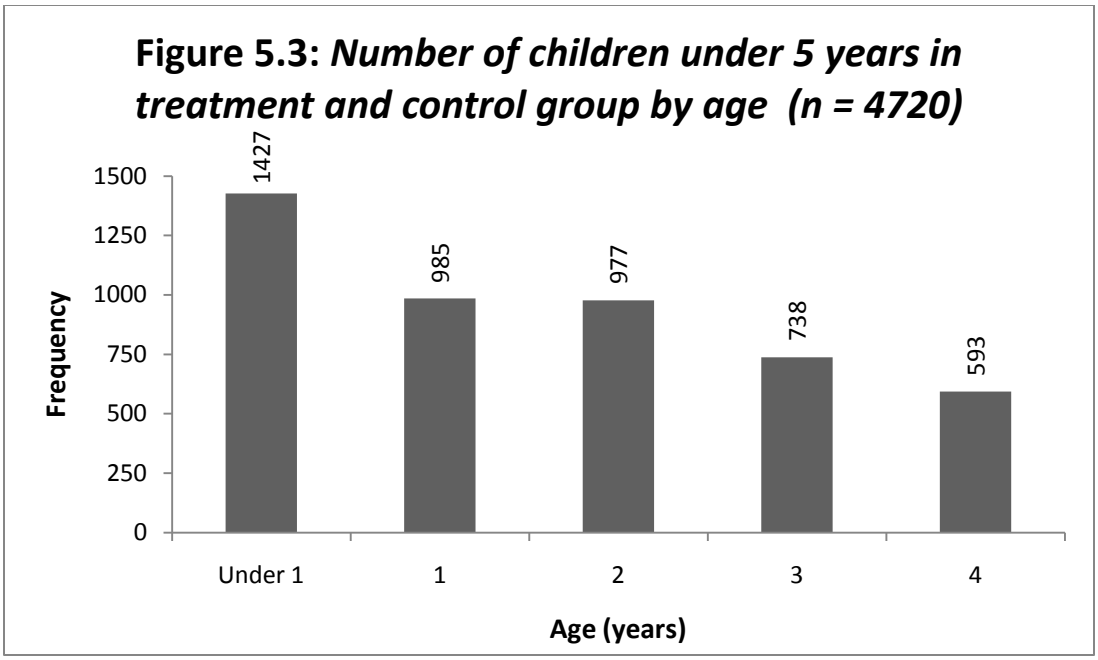
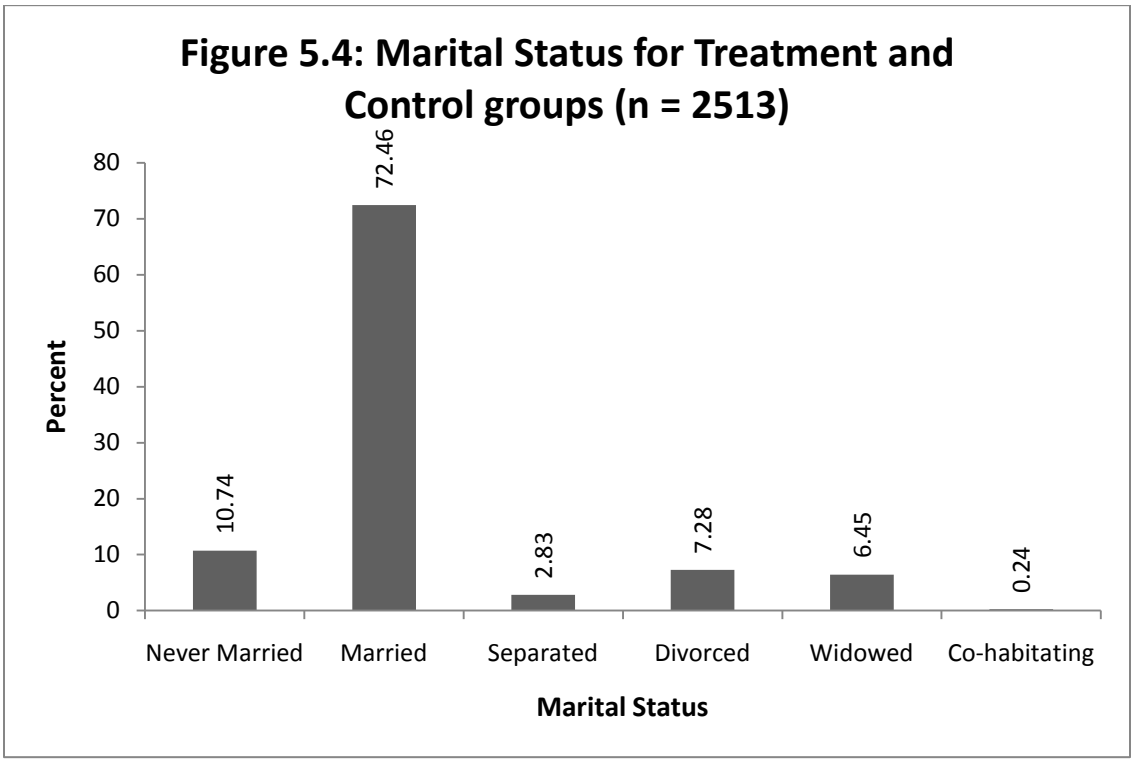


Figure 5.3 depicts the number of children under 5 by age. There are fewer children per age group as age increases, with almost one-third as many children in their fifth year of life as in their first. This steep decline demonstrates the motivation for selecting these districts for the CGP because they have some of the highest child mortality rates in the country.

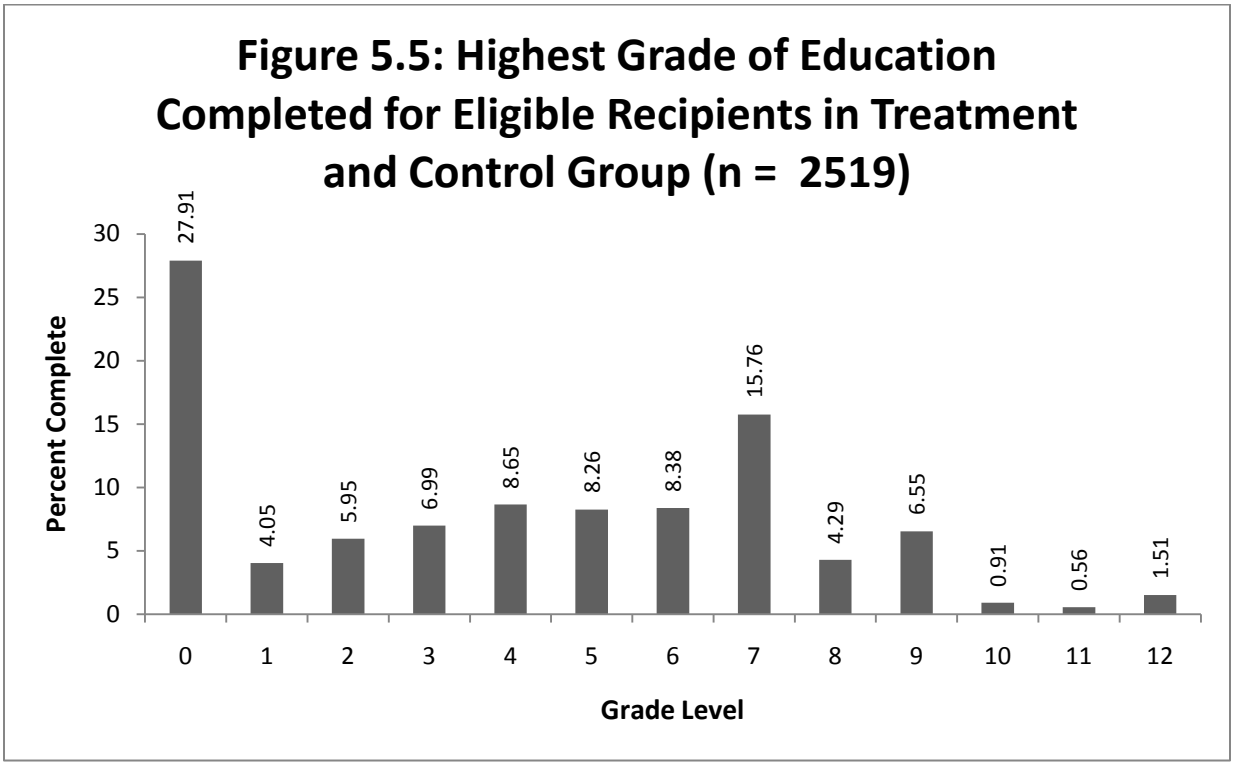


Recipients

The CGP defines recipients as the female head of household, who can be a mother or a grandmother. If no female head of household is present, the father can be named the household recipient. Male recipients represent a rare occurrence in the sample, with only 1 percent of recipients (28 households) being male. The ages of the recipients range from 14 to 78, with the average recipient 29.9 years old and the median recipient 28 years old. Roughly three-quarters of the sample are married and another 10 percent have never been married. The entire marital status distribution is depicted in Figure 5.4.



The program's recipients are not very well educated; 27.9 percent did not attended school and over 54 percent did not go beyond grade 4. Only 10 percent attended school past grade 8. Figure 5.5 shows the distribution of the highest level of education completed by grade for the sample.



Children

The CGP targets households with children under age 5 in districts with the highest infant mortality and morbidity rates in the country. Therefore, children, especially children under 5, represent the most important subsample of the study. This study is unique for having children make up a large proportion of the sample, with one-third of the sample under age 5 (4,793) and two-thirds of the sample under age 18 (9,384), as shown in Table 5.2. These large sample sizes enable us to investigate effects among subgroups of the population and detect small impacts with a high degree of statistical power.

For children under age 5, only 3.5 percent have been orphaned because their mother is dead, and 8.1 percent have been orphaned because their father is dead. Over 23 percent of the children under age 5 have a father who is alive but does not live in the household. The next section reports on a set of young child health, nutrition, and feeding indicators in the context of a comparison with national data of Zambia.[13]

An exciting aspect of the household questionnaire is the inclusion of a newly released early childhood development (ECD) module, which has been developed and tested by UNICEF and will be rolled out as

[13] In the Appendix we provide a detailed discussion of the anthropometric measures for children ages 0–59 months, along with comparisons to national data.

part of its global MICS 4 Program, although it has not yet happened in Zambia. We administered this module to children ages 3 through 7 in our sample and are able to construct six recommended indicators from the data these are ECD indicators 6.1 and 6.3–6.7 in the MICS Child Development Indicator List).[14] *Support to Learning* measures whether an adult played with the child, counted, named or drew things with the child, sang songs or told stories to the child, read books or looked at pictures with the child or took the child outside the compound. *Learning Materials* refers to possession of at least three books, or whether the child plays with homemade or store-bought toys, or objects around the home such as pots, bowls, rocks or sticks. *Adequate Care* measures whether the child was ever left alone for more than one hour, or left in the care of someone less than ten years old. *School Attendance* includes any sort of formal program including pre-school and day-care. Finally the *ECD Index* is a 10-item scale that covers four developmental domains: Physical (both gross and fine motor), Language and Cognition, Socio-Emotional, and Approaches to Learning.

Table 5.3 shows that 43 percent of children ages 3 through 7 have adequate support for learning, less than 2 percent have at least three books in the house, 31 percent receive adequate care, and 14 percent are in a formal school program. The mean score in our sample is 4.84, and 55 percent of children scored 5 or more on this 10-point scale. The recommended age group for three of these indicators (ECD Index, School Attendance, and Support to Learning) is 3 through 5, so the second column of the table shows the results for this younger age group. What is somewhat surprising is that there is very little change in the mean value of five of the seven indicators between the younger age group and the full ages 3 through 7 group. School attendance is noticeably lower among the younger age group, as is the proportion of children scoring lower than 5 on the ECD index (although the mean score itself does not change by much, illustrating that 5 is an important threshold in this scale), but other indicators remain essentially unchanged. These indicators are only beginning to be incorporated into MICS surveys around the world, so we are not yet able to put these numbers into a larger context. A recent MICS conducted in settlement areas of Mombassa in 2009 was one of the first to implement the ECD module. That survey showed 6.7 percent of children with at least three books, 89 percent with all three designated playthings, 80 percent with adequate care, and 62 percent currently attending school. All these numbers are much higher than those reported here, although naturally the socioeconomic status and access to services of that sample are significantly different from those in our sample.

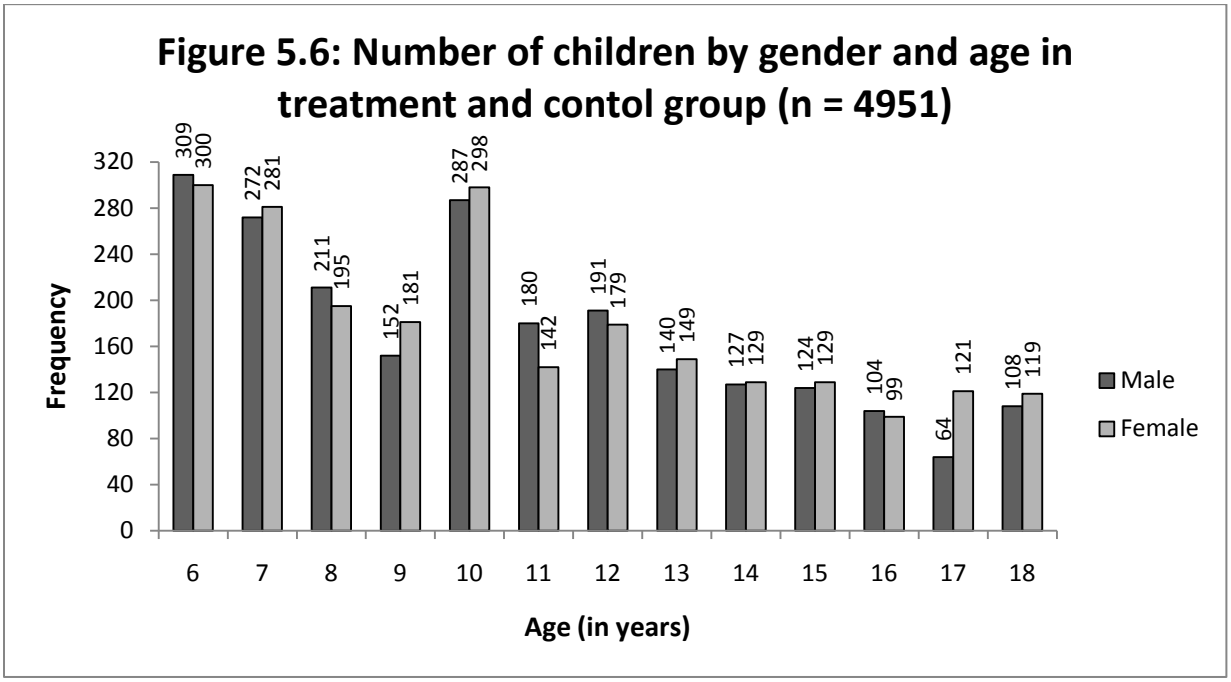
[14] See http://www.childinfo.org/mics4_tools.html.

Table 5.3: Early Childhood Development Indicators for Children 3–7 Years

	Ages 3–7 Years	Ages 3–5 Years
Support to Learning (6.1)	42.74	41.36
Learning Materials: Books (6.3)	1.56	0.98
Learning Materials: Playthings (6.4)	62.45	61.32
Adequate Care (6.5)	31.31	32.7
ECD Index Score	4.84	4.38
ECD Score 5+ (6.6)	55.47	45.2
School Attendance (6.7)	14.17	3.43
N	2827	1724

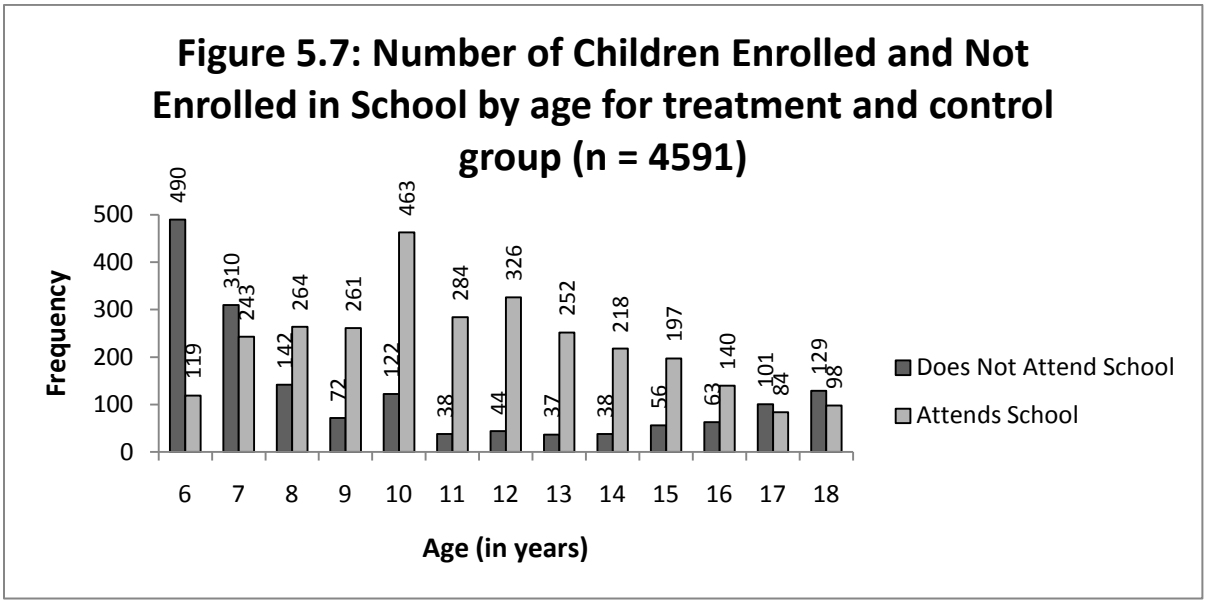
NOTE: MICS 4 Indicator number is in parentheses.

Children ages 6 through 17 make up roughly one-third of our sample. Figure 5.6 depicts the distribution of these children by age and gender. The distribution is skewed toward the younger ages, which should not be surprising because all the children must have at least one sibling under age 3 to be part of the sample.



One-third of the school-aged children (those age 6 and older) have never attended school. Almost a quarter (22.63 percent) of school-aged children are orphaned with at least one parent deceased. Perhaps most telling about the poverty of the sample, 22.49 percent of these children do not have a blanket, shoes, or two sets of clothing, thus scoring the lowest value (0) on the orphans and vulnerable

children (OVC) material well-being scale.[15] Similarly, only 11.09 percent of school-age children in the sample score the highest on the OVC scale, meaning that they have all three: shoes, blanket, and two sets of clothing. These results are primarily driven by the lack of shoes because only 14 percent of children own a pair of shoes or sandals, 64 percent have or share a blanket, and 75 percent own a second set of clothing. Figure 5.7 shows the percentage of children ages 6 through 18 who attend school, by age. Enrollment peaks at around 90 percent for 11- to 14-year-olds, but quickly drops off as they approach their late teens.



Food Expenditure

Increased nutrition and food security, especially for young children, are two primary goals of the CGP according to the MCDSS. At baseline, the average household spends 30,080 kwacha (roughly U.S. $6) per person per month on food, which represents roughly 72 percent of its total per capita expenditures. Thus, food is where most money is spent. The biggest portion of money spent on food is for cereals at 33 percent, which includes the staple food, maize, and 49 percent is spent on carbohydrates as a whole when we also account for roots and tubers. Fruits and vegetables signify the second biggest category, with 22 percent of overall food spending in this category. Figure 5.8 shows the proportion of food spending by food category. Proteins and fats are small relative to carbohydrates, explaining why we see malnourished children in the sample.

[15] The material well-being scale is a recommended indicator to measure care and support for OVC. See UNICEF. (2005). *Guide to monitoring and evaluation of the national response for children orphaned and made vulnerable by HIV/AIDS*. New York Author. Available at http://www.measuredhs.com/hivdata/guides/ovcguide.pdf

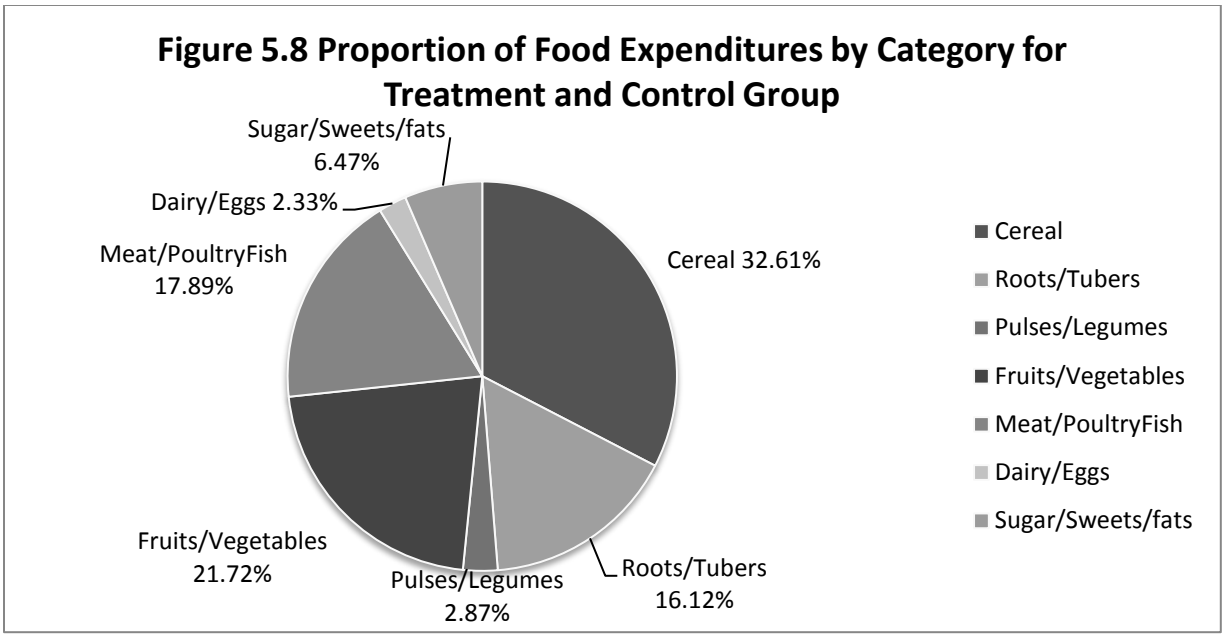


Figure 5.8 Proportion of Food Expenditures by Category for Treatment and Control Group
Sugar/Sweets/fats 6.47%
Dairy/Eggs 2.33%
Meat/PoultryFish 17.89%
Cereal 32.61%
Fruits/Vegetables 21.72%
Pulses/Legumes 2.87%
Roots/Tubers 16.12%
Cereal
Roots/Tubers
Pulses/Legumes
Fruits/Vegetables
Meat/PoultryFish
Dairy/Eggs
Sugar/Sweets/fats

VI. Targeting Analysis

The CGP employs geographical and categorical targeting to select program recipients. How does the targeted population compare with all households in Zambia? To answer this question, we use the Zambian Living Conditions and Monitoring Survey (LCMS) 2006, a nationally representative multitopic household survey conducted by the Central Statistical Office (CSO) every two years. The CSO derives its official monetary poverty statistics from the LCMS, using consumption expenditures per adult equivalent as the welfare metric. Ideally, we would compare aggregate consumption from LCMS 2010 with consumption by the evaluation sample because, as mentioned earlier, we have implemented the identical consumption module in the evaluation as was implemented in that survey. Unfortunately, LCMS 2010 is not yet available for public use at the time of writing this report. The LCMS 2006 consumption module is very similar (but not identical) to the 2010 instrument, so a comparison of consumption data across the two surveys can still provide reliable insights on the relative welfare of the targeted population within a national context.

We compare a set of demographic, expenditure and poverty indicators using four different subsamples of the LCMS data.[16] We begin with an all-Zambia rural sample because our evaluation sample is exclusively rural. Within this group, we limit comparisons to households with at least one child age 5 or under. We then restrict the LCMS sample to all households in the three evaluation districts only and then within this sample to households with at least one child age 5 and under. Note that for the district-level analysis, we do not restrict to rural households only because that would severely limit the sample sizes within the LCMS.

Table 6.1 shows selected demographic characteristics of households from the evaluation sample and the four LCMS subsamples described above. Although overall household size is comparable across the CGP sample and the all-rural sample, the CGP sample has almost one more child under 6 on average than the all-Zambia rural sample and the three districts sample, and about one less person (on average) age 13 and above. When we limit the LCMS samples to households with preschool children, the mean number of children is still about 0.30 lower in the LCMS sample than among the CGP eligible group, with correspondingly more children ages 6 through 12 and more older members. As mentioned earlier, this difference occurs because the CGP selects households with children under 3, many of whom also have a sibling under 6. The most comparable LCMS sample is in the last column, which clearly shows that the target group has slightly fewer household members, more children under 6, and fewer older family members.

[16] Thanks to Alexandra Graddy-Reed for excellent research assistance with the LCMS data.

Table 6.1: Comparison of Mean Household Demographic Characteristics With National Samples

		LCMS 2006			
Variable	CGP	All Rural	Rural, Child < 5	3 Districts	3 Districts, Child < 5
Household Size	5.69	5.18	6.18	5.05	5.89
Number of Children Ages 0–5	1.90	0.87	1.62	0.74	1.60
Number of Children Ages 6–12	1.26	1.20	1.42	1.24	1.35
Number of People Ages 13+	2.53	3.11	3.14	3.07	2.94
N	2,515	9,132	4,899	540	249

Note: CGP sample excludes 4 households with 0 reported expenditures.

Table 6.2 reports means for total and food expenditures per person as well as per capita spending on a few key expenditure groups. The CSO measure for total consumption expenditure includes the use value of housing (imputed rent), water, and electricity, which are estimated through statistical modeling. Because we do not have enough information to replicate these estimates, we exclude these items from the reported total expenditure aggregate provided in the public use version of the LCMS 2006 to maintain as much comparability in measures as possible. Mean values for total and food expenditures are significantly lower in the CGP sample compared with all LCMS samples, although the difference is least in the most comparable LCMS sample—households in the three districts with at last one preschool child (last column). About 19 percent of households in the CGP report no maize cereal consumption in the previous week. We exclude these households from the analysis in column 2, and while this exclusion increases the mean total and food expenditures, they are still 38 and 29 percent lower, respectively, than the most comparable LCMS sample. To further explore possible sources of discrepancy, we report cereal and staples (cereals plus roots and tubers) expenditures, but these are also significantly lower among the CGP sample relative to even the most comparable LCMS sample.

Although some of these observed differences may be due to survey instruments, the differences are too large to be wholly explained by that alone. One very real possibility is that we are unable to exactly replicate the CSO approach for computing aggregate consumption—we hope that its methodology (as well as the 2010 data) will be available in the near future. It may also be that the sample size of households within the three districts in the LCMS data is not large enough to generate accurate estimates of the true population means for these households (N = 249). The much larger sample size in the CGP would then better reflect the true characteristics of this population.

Table 6.2: Comparison of Household Consumption Expenditures (Per Capita) With National Samples

Variable	CGP	CGP, Cereal > 0	LCMS 2006			
			All Rural	Rural, Child < 5	3 Districts	3 Districts, Child < 5
Total	40,484	43,157	129,203	98,006	78,179	69,141
Food	30,080	32,057	81,363	61,329	53,110	45,273
Alcohol & Tobacco	404	439	8,449	8,716	3,694	3,802
Cereal	9,855	12,127	26,581	18,754	25,483	21,251
Staples	14,490	15,630	33,235	23,762	30,857	26,949
Meat, Poultry, Fish	5,905	6,284	21,992	17,087	10,905	8,756
Food Share	0.720	0.720	0.688	0.678	0.748	0.745
N:	2,515	2,044	9,132	4,899	540	249

Note: All expenditure units are 2010 kwacha per person except food share, which is ratio of food to total spending. Staples are cereal plus roots and tubers.

Our final comparison is of poverty rates between the two data sets. We use the CSO-defined national poverty lines from 2006 and inflate these to 2010 kwacha and then assess the proportion of individuals living in households with reported per capita expenditure below these lines. The most comparable LCMS sample shows 85 percent of individuals below the extreme poverty line, and only 6 percent are not poor. In the CGP sample, 95 percent of individuals are in extreme poverty and only about 1 percent are not poor. Note that these poverty rates are not directly comparable to national estimates because we have excluded imputed rent, water, and electricity from the LCMS consumption aggregate to make it comparable to our own aggregate while still retaining the official poverty line.

So how do we assess the targeting strategy of the CGP? If we use monetary poverty as the evaluative criteria (which may not be appropriate because the program is not strictly poverty targeted) and look at the four LCMS subsamples, we see that the strategy leads to progressive targeting because of the geographic targeting strategy. The difference in poverty rates between the all-rural sample (65 percent) and the three districts (82 percent) is a very large 17 percentage points. The additional increase in poverty rates when moving from all households to households with a young child (within the same geographic area) are very small. In the three districts, for example, the difference in poverty rates between all households (82 percent) and those with a young child (84 percent) is only 2 percentage points. In the all-rural sample, this difference is only 4 percentage points (65 versus 69 percent).

Table 6.3: Comparison of Poverty Rates (%) With National Samples

		LCMS 2006			
Variable	CGP	All Rural	Rural, Child < 5	3 Districts	3 Districts, Child < 5
Extremely Poor	95.10	64.55	68.49	82.33	84.49
Moderately Poor	4.02	20.46	19.37	11.87	9.43
Not Poor	0.88	14.99	12.14	5.80	6.08
Total N:	2,515	9,132	4,899	540	249

Note: Extreme poverty line is Kw 62,248 and moderate poverty line is Kw 106,413 in 2006 units. These are inflated by dividing by 0.688 to obtain 2010 units. Welfare metric is expenditure per capita not including imputed rent, water, and electricity and is thus slightly different from the aggregate measure reported in official LCMS 2006 documentation. Consequently, poverty rates are higher than official statistics.

Comparison of Other Indicators

The prior analysis suggests that CGP households are significantly poorer than the average Zambian rural household. How do they compare with respect to other welfare indicators? To facilitate this comparison, we purposely include in the evaluation survey a set of more subjective welfare indicators that are routinely included in the LCMS—these are reported in Table 6.4 by sample. Each of these five indicators is coded so that higher values indicate worse outcomes. Notice that on every item, households in the CGP have higher values than households in the LCMS. The largest and perhaps most concerning difference is the proportion of CGP households eating only one meal a day (21 percent) and the proportion eating vegetables fewer than five times in the previous week (38 percent); the corresponding proportions are much lower in the LCMS samples. For example, in the most comparable LCMS sample, the proportions are 12 and 20 percent, respectively. These results validate the differences in total expenditure and monetary poverty reported in the previous section.

Table 6.4: Comparison of Self-Reported Welfare Measures With National Samples

		LCMS 2006			
Variable	CGP	All Rural	Rural, Child < 5	3 Districts	3 Districts, Child < 5
Considers itself very poor	58.72	46.51	44.52	57.96	55.02
Household worse off compared with 12 months ago	26.91	16.88	17.07	17.04	21.29
Eats one meal a day	21.13	5.36	4.33	15.74	12.05
Ate meat/fish < 5 times in last month	68.36	64.72	61.50	64.44	58.63
Ate vegetables < 5 times in last week	37.65	22.07	23.29	20.00	19.68
N	2,515	9,132	4,899	540	249

Note: Indicators are from Section 10 in LCMS 2006 data files. Identical questions were fielded in the CGP survey.

We now turn to a selected number of child welfare indicators and see how these compare with national data. Because the ZDHS contains a richer set of child welfare indicators than the LCMS, particularly for young child health, nutrition, and care, we incorporated questions from the ZDHS into the CGP evaluation instrument to facilitate a direct comparison with national statistics. Table 6.5 provides the means for some of these indicators around health, nutrition, and feeding for younger children, as well as indicators for older children. Some of these indicators are complex to build (e.g., the minimum recommended feeding depends on age and breastfeeding status of the child), but we have constructed the indicator exactly the same way in both the CGP and the original ZDHS files, using the definitions provided in the ZDHS official publication. For the ZDHS we show indicators for the full national sample, the full rural sample, and for the Western and Northern Provinces, which contain the three districts used for the CGP evaluation. Note that the ZDHS is not representative at the district level nor can we make inferences by rural/urban within Provinces.

The top panel of Table 6.5 shows that young children in the CGP appear to be in worse health than their counterparts nationally. CGP-eligible children are more likely to be smaller than average (as reported by the mother) at birth (18 versus 11 percent) and to have suffered from diarrhea and fever, in the reference period. However, program children are more likely to have sought care when sick and are also more likely to possess a vaccination card (88 versus 67 percent in the two Provinces). Additional analysis we conducted demonstrates that curative care seeking is highly positively associated with possession of a health card so it is not surprising that the rates of curative care are higher among CGP children given their much higher prevalence of health cards. This in turn may be because of program rules which require documentation of a child's birth date in order to prove eligibility.

In terms of feeding, while CGP children under 6 months are more likely to be exclusively breastfed (65 versus 46 percent in the two Provinces), older children (6 through 23 months) are much less likely to be fed the minimum recommended number of times per day (only 31 percent versus 49 percent nationally and 48 percent in the two provinces), suggesting that the transition to solid foods is a critical period of vulnerability for this group. The nutritional indicators in the table present somewhat of a puzzle. The level of stunting is lower in the CGP sample (35 percent versus 41 percent in the two provinces) when we consider all children 0-59 months. However for children under 18 months stunting rates are actually slightly higher (28.6 percent) in the CGP sample relative to the two provinces (26.8 percent) This pattern occurs for the other two anthropometric indicators as well—slightly worse levels for children under 18 months in the CGP compared to the full sample. For the full 0-59 age group, the level of wasting is about two percentage points higher in CGP relative to ZDHS while the level of underweight is actually one percentage point higher in the CGP sample.

The Appendix provides a detailed analysis of the anthropometric data quality and comparisons with the ZDHS. This shows that that there is more measurement error in height-for-age relative to the other two indicators in both the CGP and ZDHS, which may affect the reliability of the cross-survey comparison (but will not affect the within-survey impact estimates, provided the measurement error is consistent across intervention and control groups). The Appendix also shows that the height-for-age z-score among CGP children is below that of ZDHS children up to age 18 months, and then suddenly improves. This might be due to mortality selection where less healthy (and shorter) children are dying at higher rates in

the CGP population. It may also be due to under-reporting of age in order to remain eligible for CGP benefits, since the program explicitly targets children under age 3-see the Appendix for more details.

The bottom panel of Table 6.5 presents three welfare indicators for older children. The proportion of orphans and vulnerable children (OVC) based on the ZDHS definition is roughly the same in the two samples, but here it should be noted that whereas the ZDHS sample is nationally representative, the CGP sample consists of at least one child under age 5 and so these are families that are much younger in the life cycle and have fewer numbers of older children. Because OVC prevalence increases with age, it is thus somewhat surprising to see such a high rate of OVC among the younger families in the CGP, an additional indication of their relative vulnerability. This vulnerability is further highlighted in the next two lines of the table, which show that CGP-eligible children are much less likely to have their material needs met (11 percent versus 56 percent nationally and 43 percent in the two provinces) and are also less likely to currently attend school (85 versus 90 percent nationally for children age 10 to 14).

There are three main conclusions from our analysis in this section. First, CGP households are poorer and more vulnerable than other households in Zambia on both monetary and nonmonetary dimensions. This result is borne out whether we use the official national poverty line of the government of Zambia or measures of food security and self-assessed well-being. Second, and following from the first conclusion, the CGP targeting criteria are progressive owing to the geographical targeting strategy of the program.. Finally, children in CGP-eligible households are significantly more vulnerable than other Zambian children, with the one exception being stunting (low height for age) among older children. Program children are less healthy, are fed fewer times than recommended, have fewer material needs met, and are less likely to be in school relative to their national peers. These outcomes themselves are undoubtedly linked to the underlying poverty and vulnerability of eligible households. Consequently, if the CGP can alleviate household-level poverty and vulnerability, the program may be able to improve the human capital deficits of CGP-eligible children.

Table 6.5: Comparison of Child Outcomes With ZDHS 2007

		ZDHS 2007		
	CGP	Total Sample	All Rural	Western and Northern Provinces
Young Child Health				
Size at birth small (0–5)	18.21	11.18	11.03	11.19
Diarrhea last 2 weeks (0–5)	18.67	15.54	14.87	16.71
Sought treatment**	75.38	58.80	59.93	54.59
Fever last 2 weeks (0–5)	23.14	17.82	18.45	22.09
Sought treatment**	72.99	62.85	61.8	55.84
ARI (cough) last 2 weeks	20.32	20.07	21.26	19.12
Sought treatment**	72.03	56.42	55.09	52.15
Child health card seen (12–23 months)	87.65	79.05	78.22	66.67
Young Child Feeding				
Minimum times fed (6–23 months)	30.67	49.36	46.08	47.59
Exclusive breastfeeding (0–5 months)	65.28	61.72	58.37	45.86

Young Child Nutrition				
Height for Age (0-17 months)				
Stunted—% below -2 SD	28.6	31.4	32.4	26.8
Mean Z-Score	-1.16	-1.02	-1.07	-0.76
Height for Age (0–59 months)				
Stunted—% below -2 SD	35.2	45.7	48.1	44.5
Mean Z-Score	-1.42	-1.69	-1.78	-1.50
Weight for Height (0-17 months)				
Wasted—% below -2 SD	9.4	9.3	9.7	11.5
Mean Z-Score	-0.26	0.12	0.12	-0.16
Weight for Height (0-59 months)				
Wasted—% below -2 SD	6.2	5.8	6.0	7.9
Mean Z-Score	-0.17	0.22	0.21	-0.88
Weight for Age (0-17 months)				
Underweight—% below -2 SD	16.6	11.4	12.0	15.3
Mean Z-Score	-0.77	-0.44	-0.49	-0.59
Weight for Age (0-59 months)				
Underweight—% below -2 SD	16.5	14.5	15.4	16.3
Mean Z-Score	-0.91	-0.78	-0.85	-0.02
Older Child Welfare				
Orphan or vulnerable child (OVC) (5–17)	21.23	21.02	17.79	19.08
All three material needs met (5–17)	10.54	55.74	42.13	43.41
Attending school (10–14)	84.67	90.27	88.48	87.49

Note: Age range shown in parentheses is years unless otherwise noted. All variables are defined exactly as in ZDHS except for ARI, which by definition includes children with rapid breathing accompanying cough. ZDHS uses weighted statistics ** Only for children who had the sickness reported in the row above.

VII. Prediction of Program Impacts

To gauge the potential impact of the cash transfer ex ante, we have used the baseline evaluation data to estimate the relationship between total per capita household expenditure and some of the key impact indicators shown in the Conceptual Framework (Section 2, Figure 2.1). For each indicator, we apply regression analysis to estimate this relationship between an outcome and total per capita expenditure controlling for age and sex of the child (for child-level indicators) or total household size (for household-level indicators). Because units of measure are not the same across outcomes, we report the SD of the effect for an SD increase in per capita expenditure to easily compare the relative magnitude of potential program effects across different outcomes.

The program provides Kw 55,000 per month, which translates to Kw 11,000 per capita per month because the median family size is five. This study shows that mean per capita expenditure in recipient households before the transfer is Kw 40,750 per person per month. Thus, the 11,000 kwacha monthly per capital transfer is a 27 percent increase to the household's monthly expenditure. This is a meaningful increase to recipients considering that 95 percent of CGP households fall below the national extreme poverty line compared to 69 percent of all rural households with children under five years old in the Zambia Living Conditions and Monitoring Survey (LCMS). The CGP transfer level is comparable to those from some of the world's most successful programs such as *Oportunidades* in Mexico and *Familias* in Colombia.

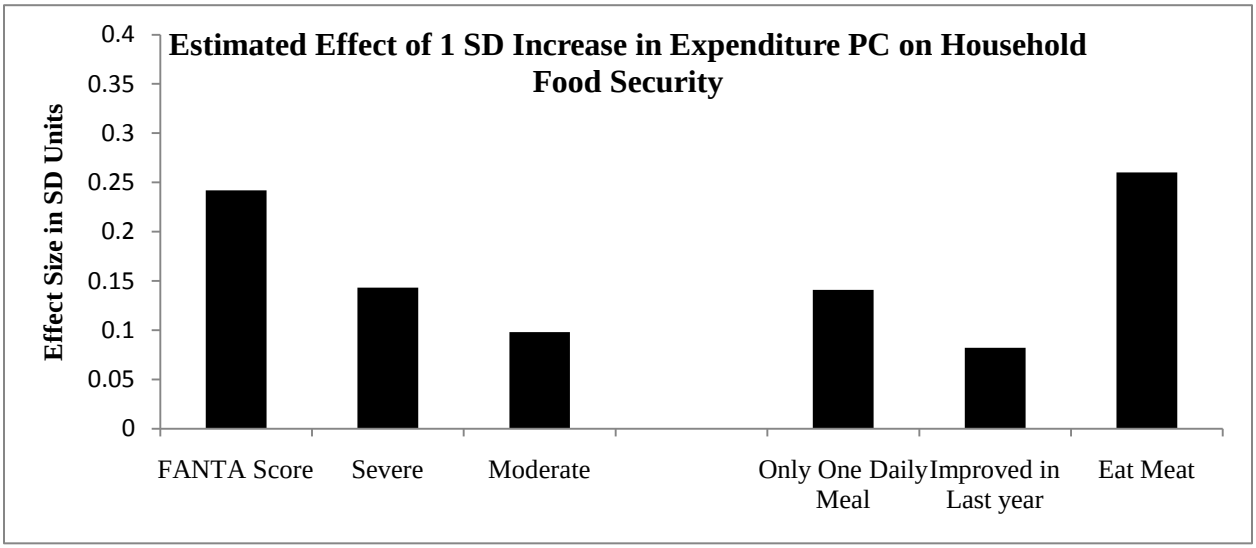
The standard deviation of per capita expenditure is just over Kw 32,000; thus, the per capita transfer is about one-third of this value, or 0.33 SD. The results we report indicate the change associated with a one SD change in per capita expenditure. Because the intervention represents only an increase of about one-third of a SD of per capita expenditure, the actual change in the indicator that we might expect at follow-up will be about one-third of what is shown here. However, for the current discussion, our focus is to assess the relative magnitude of possible program impacts across outcomes so that we can understand where we might find impacts of the CGP at follow-up. Note that all effects are defined to show improvement in the outcome.

Because the program will have an immediate and direct impact on household spending and material well-being, we begin by showing the expected changes in some of these indicators associated with a one SD change in total per capita expenditure. Figure 7.1 shows the expected impacts on the Food and Nutrition Technical Assistance Project (FANTA) food security score and the probability of being severely or moderately food insecure (based on FANTA cut-offs in the score).[17] We also show predicted impacts from three LCMS-derived indicators (only one meal per day, whether the household felt it was better off relative to one year ago, and whether the household ate meat five or more times in the last month). In each case, the predicted impact of the CGP is large and statistically significant. For example, a one SD change in per capita expenditure is expected to yield a 0.25 SD increase in the FANTA food security score and to reduce the likelihood of eating only one meal per day by 0.15 SD. Taking into account that the

[17] Coates, J., Swindale, A., & Bilinsky, P. (2007). *Household food insecurity access scale for measurement of food access*. Washington DC: Food & Nutrition Technical Assistance Project (FANTA). Available at www.fantaproject.org

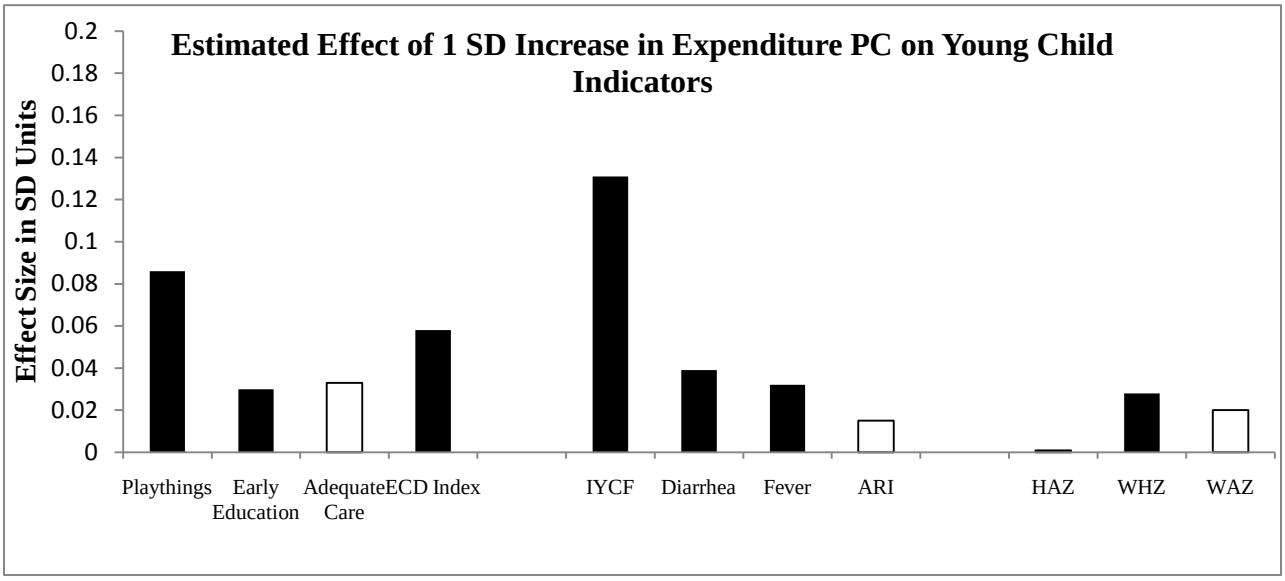
actual change is one-third of a SD, these translate into about a 3 and 10 percent change in the value of each outcome, respectively.

Figure 7.1



We next turn to a set of young child health, nutrition, and development indicators that we have presented elsewhere in this report. In Figure 7.2, light bars indicate that the effect is not statistically significant. We immediately can see that in general, the predicted effect sizes in Figure 7.2 are much smaller than those in Figure 7.1. This should not be a surprise because, as explained in the Conceptual Framework, these are second-order effects that work through the immediate effect of the program on the household-level indicators reported above. Among these young child indicators, we see larger potential impacts on Infant and Young Child Feeding (IYCF), possession of at least two playthings (toys), and the overall child development score. The effect size for IYCF implies an actual predicted increase of 7 percent in the proportion of children ages 6 through 24 months with adequate feeding. The figure also indicates that we probably will not find statistically significant impacts on height for age (HAZ) and weight for age (WAZ), the prevalence of ARI, or adequate child-care at home.

Figure 7.2



In Figure 7.3, we show the expected impacts on three older child indicators: material well-being (having shoes, clothes, and a blanket), school enrollment, and incidence of illness in the previous two weeks. We see a particularly large expected impact on the material well-being indicator (almost 0.20 SD, or an actual program effect of 17 percent) and a statistically significant but very small predicted impact on schooling (0.05 SD or about a 1 percent program impact) but no potential impact of the CGP on morbidity. Table 7.1 shows the baseline mean value for indicators with significant expected impacts along with the predicted percent change due the program.

Figure 7.3

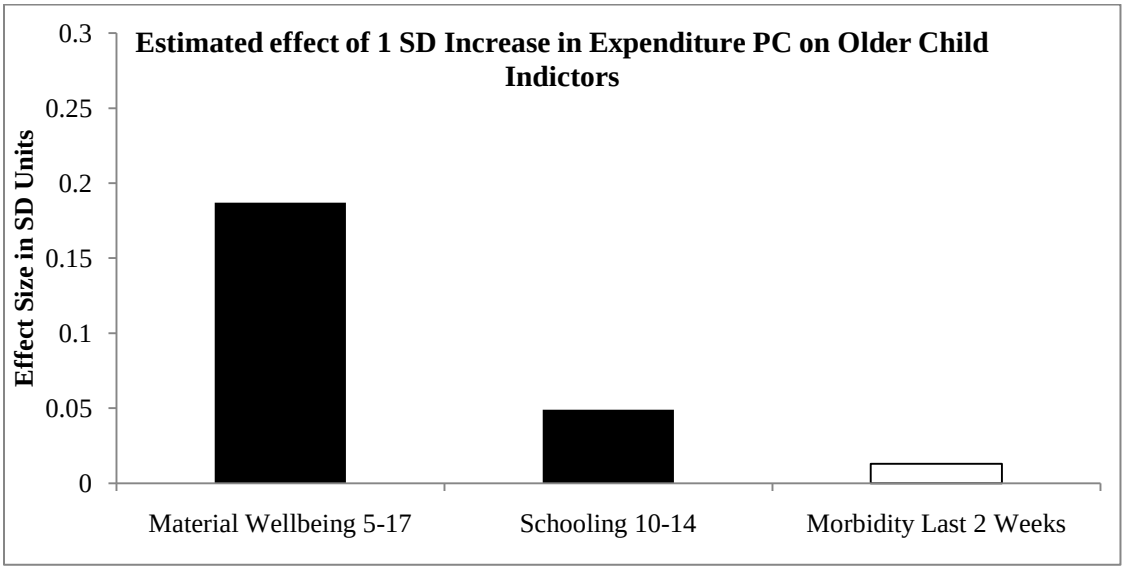


Table 7.1: Predicted Impacts		
Indicator	Baseline Mean	Predicted Percentage Change
<u>Household Level</u> FANTA Score	15	3
Severely Food Insecure	90%	2
Moderately Food Insecure	7.5%	13
Only One Daily Meal	21%	10
Eats meat >5 Times/Week	32%	11
Young Child Indicators ECD Index	4.8	2
Infant & Young Child Feeding	31%	7
Diarrhea	19%	3
Fever	23%	3
Weight-for height z-score	-0.17	7
<u>Older Children</u> Material Well-being	10.5%	17
Schooling	85%	1

Because the primary immediate impact of the CGP will be on consumption, it is of interest to dig deeper into the potential impacts of the program on consumption behavior, for both food and nonfood, because this will the key pathway for realizing the impacts described above. Using the economic theory of consumer demand, we estimate a system of demand equations for eight mutually exclusive expenditure groups, relating each one to total per capita expenditure. Using these equations, we can calculate theoretically consistent responses (referred to as "elasticities" in economic theory) to the change in total per capita expenditure associated with the cash transfers under the CGP.[18] Given the average transfer per person to the household (Kw 11,000, which is a 27 percent increase in mean per capita expenditure), the average level of spending on each item at baseline, and the estimated "response," we can calculate the expected change in consumption due to the program.[19]

Table 7.2 provides these estimates for eight broad budget categories. The first column shows the predicted impact of the program in kwacha, while the second column reports the share of the transfer that is devoted to each item. Notice that the sum of each individual impact in column 1 is constrained to

[18] The estimates are theoretically consistent in that they do not violate the budget constraint. That is, the sum of the predicted responses should not exceed the total amount of additional money provided by the program (Kw 11,000 per person per month).

[19] Mathematically, the estimated response (or elasticity) for each item, measured in percent terms, is multiplied by the percent increase in mean X per capita expenditure implied by the program (27 percent) to get the total impact of the program on that item in percent terms. This total impact is multiplied by the actual mean level of spending to obtain the predicted impact in kwacha.

sum to approximately the mean value of the transfer (our estimate is Kw 11,216, well within the confidence bound of Kw 11,000, the actual mean value)—this is a crucial aspect of the estimation approach. Based on preprogram behavior and the assumption that behavior is stable (i.e., household preferences do not change drastically over time), about 78 percent of the increase in cash will be devoted to food, 7.4 percent to domestic items (primarily charcoal, wood, kerosene, and other fuels), and 5 percent to health and hygiene. Virtually none of the additional cash will be spent on educational expenses. In some cases, these effects are different from actual mean shares at baseline. For example, the food share currently is only 72 percent, while the share spent on domestic is a very large 16 percent, much larger than the share of the transfer that this item is predicted to command. In contrast, the actual share toward health and hygiene is 5 percent, which is about the same as the predicted share out of the CGP transfer.

Table 7.2: Predicted Impact of CGP Payment on Consumption and Actual Consumption Share

	Kwacha	Allocation of Transfer Payment	Actual Allocation of Expenditure
Food	8764	0.781	0.719
Domestic	827	0.074	0.156
Health	557	0.050	0.056
Transport & Communication	494	0.044	0.011
Education	83	0.007	0.014
Clothing	279	0.025	0.034
Other	41	0.004	0.002
Alc & Tobacco	170	0.015	0.008
Total	11216	1.000	1.00

Note: See text and footnote 11 for details on estimation approach.

Table 7.2 indicates that the payment of Kw 11,000 through the CGP will lead to an increase per capita of about Kw 8764 in food spending. We use the same methodology described above to simulate the composition of food spending on the basis of existing (preprogram) tendencies. Results of this analysis are provided in Table 7.3. Again, because we estimate the food demand equations as a system, we are able to impose the budget constraint so that the sum of the increase in spending on each food item is approximately equal to the total increase in food spending estimated above (Kw 8764). The results show that 34 percent of the additional money for food will go to cereal consumption, 24 percent will go to meats (including poultry and fish), and 18 percent will go to fruits and vegetables. The allocation of the CGP transfer is different from the actual distribution of food shares at baseline. For example the mean share devoted to meat/poultry/fish is currently 18 percent but the share of CGP money devoted to these items is predicted to be substantially larger at 24 percent. In general we see a shift away from tubers and vegetables and towards meats, dairy and sugars. Thus, based on these simulations and assuming preferences remain stable, we predict that the CGP will improve diet diversity among recipient households.

Table 7.3: Predicted Impact of CGP on Food Consumption

	Kwacha	Allocation of Transfer Payment	Actual Allocation of Expenditure
Cereals	2901	0.339	0.326
Tubers	1218	0.142	0.161
Pulses	253	0.030	0.029
Fruits & Vegetables	1560	0.182	0.217
Meats	2017	0.236	0.179
Dairy	232	0.027	0.023
Baby Foods	4	0.000	0.000
Sugars	330	0.039	0.018
Fats	47	0.005	0.046
Total Increase	8561	1.000	1.000

Note: See text for estimation details.

The implication of this analysis is that the CGP is likely to have significant impacts on household-level indicators such as food security and self-assessed well-being. These impacts are consistent with the Conceptual Framework, which shows this as being the first link in the causal chain. Expected impacts on children are likely to be smaller because these represent the second link in the causal chain, but many of these are also likely to be statistically significant, such as IYCF, material well-being of older children, and ECD. However, it appears that the program may not have significant impacts on anthropometric outcomes, particularly HAZ, which is an indicator of long-term or chronic malnutrition. Our ex ante analysis has looked only at potential treatment effects among all households without considering the role of mediators or moderators. It is quite possible that the program may influence nutritional status in the presence of such important moderators as mother's literacy or access to better health services—these can be explored at follow-up to give a further understanding of the causal pathway of the program on household welfare.

Our initial examination of spending behavior suggests that the bulk of the transfer (78 percent) will be spent on food, followed by fuel and health/hygiene. Within foods, we predict an important improvement in diet diversity. While the largest share of the increase in food spending will continue to go to cereals because of the highly food insecure nature of the households (34 percent), 24 percent of the increase will go towards meat, poultry and fish which is much larger than the actual share devoted to these items currently. We thus expect to find significant improvements in food security and diet diversity at follow-up, which in turn may ultimately affect child nutritional status.

VIII. Limitations and Conclusion

In this final section, we present the limitations to the data collection and our conclusions.

Limitations

Several limitations to the baseline data collection might affect the study's impact estimates and generalizeability, although we do not believe that these limitations cause a meaningful threat to the validity of the study. Baseline data were collected in October 2010, a few months after Zambia's biggest recorded harvest of maize in the country's history in May 2010. According to the national newspaper, *Times of Zambia*, "Zambia has recorded an unprecedented bumper harvest of more than 2.7 million tonnes of maize, representing a 48 percent increase from the last year."[20] The previous record harvest was 1.9 tonnes in 1989. Maize is the primary staple food and cash crop for the country; therefore, a bumper harvest of maize should improve the amount of food available to everyone in the country, including our sample. We expect our baseline measures of food consumption to be higher than in the average year. This unique harvest will not affect the validity of our impact estimates because we have a randomly selected control group that also experienced the same bumper harvest. However, we might underestimate the impact of the intervention at follow-up rounds of data collection because everyone in the sample started with a higher than average amount of maize and food compared with their situation in other years. This could affect the external validity of the impact estimates for other time periods.

There was some community targeting that occurred within CWACs after categorical targeting because the ministry printed insufficient numbers of enrollment forms, so the community had to select households among a larger group of those eligible. Communities officials said that they selected households from all areas within their CWAC and did not favor anyone, but this process could not be verified. We do not believe that this last round of selection poses a threat to the internal validity of the evaluation because it occurred in both treatment and control CWACs and we observed equivalence between the two conditions at baseline. However, this unofficial community selection could affect the external validity of the program if the poorest or wealthiest households were selected. Impact estimates for the study could potentially be higher or lower than impacts to the average recipient depending on the type of households selected for initial enrollment.

Main Conclusions

The Sample: We have collected a large and representative sample that was randomly selected. The sample is unique for cash transfer evaluations in Africa because it contains a large number of children under 5 years old, enabling us to detect small effects among this age group. There are 2,515 households and 14,565 people in the study. The program targets households with children under age 5, so it is important to have a large number of children in that age range in the study. The sample includes 4,793 children under age 5, with the largest number under age 1. The sample size decreases by age as a result of the high rates of child mortality in the study area. Among the recipients, 99 percent are women, 25

[20] Sianjalika, B. Zambia in historic bumper harvest. *Times of Zambia*. Saturday, May 22, 2010.

percent of whom never attended school. The program aims to assist extremely vulnerable households with children. The program appears to have met this goal because over 22.5 percent of children ages 6 through 18 in the study do not own a pair of shoes, a blanket, or a change of clothing, classifying them in the most vulnerable category on the United Nations vulnerability scale. Only 11 percent of children in the sample have all three items.

Randomization: We compare the treatment and control groups at baseline to assess equivalence along outcome and control indicators. Randomization appears to have worked because only a few indicators are statistically different between groups and the differences are not large enough to be meaningful. Our large sample size enables us to detect small and meaningless differences as significant. We also expect some spurious differences because of the large number of statistical tests we ran to detect differences (more than 60). The differences that we do find will be controlled for during analysis when estimating impacts.

Conceptual Framework: We lay out a conceptual framework for understanding and evaluating the impact of the CGP on the household. This framework posits that the immediate or direct effects of the program will be to alter consumption patterns and time-use. These effects may work directly, or they may be mediated through women's bargaining power or preferences. The first-order effects will in turn have secondary impacts on child development outcomes. All these effects (first and second order) may be moderated by factors such as access to facilities and markets and maternal education.

Targeting and Comparison to National Samples: Poverty rates are higher in the three program districts than the national average, and the results presented here indicate that CGP-eligible households are even poorer than other household in these districts, with a poverty rate of 95 percent versus 85 percent in the most comparable LCMS sample. Self-assessed well-being measures and food security indicators are consistent with this result—CGP-eligible households are more food insecure and report lower welfare levels than their counterparts in the LCMS. Targeting in the CGP is highly progressive due to the geographical targeting approach. Finally, on all child welfare indicators except one (stunting), we find CGP-eligible children to be significantly worse off than the all-Zambia average reported by the ZDHS. Thus, on both poverty and human development metrics, the targeting strategy in the CGP is highly progressive.

Transfer Size: The program provides Kw 55,000 per month, which translates to Kw 11,000 per capita per month because the median family size is five. This study shows that mean per capita expenditure in recipient households before the transfer is Kw 40,750 per person per month. Thus, the 11,000 kwacha monthly per capital transfer is a 27 percent increase to the household's monthly expenditure. This is a meaningful increase to recipients considering that 95 percent of CGP households fall below the national extreme poverty line compared to 69 percent of all rural households with children under five years old in the Zambia Living Conditions and Monitoring Survey (LCMS). The CGP transfer level is comparable to those from some of the world's most successful programs such as *Oportunidades* in Mexico and *Familias* in Colombia.

Predicted Program Effects: Our prediction of program effects indicate that the CGP is likely to have positive and statistically significant impacts on first order and second order indicators. We estimate significant increases in the number of meals per day and the FANTA food security score. We predict that 78 percent of the CGP transfer will go to food spending, seven percent to fuel and five percent to health. Within food, we estimate that 34 percent of the increased spending on food will go to cereals, 24 percent to meats and 18 percent to fruits and vegetables. We expect that the CGP will have important impacts on diet diversity and food security of eligible recipients. Predicted second order effects, those on child outcomes, are smaller but most are also statistically significant, the main exceptions being nutritional status (HAZ and WAZ). However for many other indicators, including several ECD domains, infant and young child feeding, and material welfare and school attendance of older children, we predict statistically significant impacts of the program.

Appendix A: MCDSS policy on selecting order of program rollout

Telephone: (260) 211 223472
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REPUBLIC OF ZAMBIA

MINISTRY OF COMMUNITY DEVELOPMENT AND SOCIAL SERVICES

DEPARTMENT OF SOCIAL WELFARE
COMMUNITY HOUSE
P.O. BOX 31958
LUSAKA

DECLARATION

Being fully aware that there is a huge demand from different stakeholders to be the first ones to be enrolled in the social cash transfer programme, this ultimately calls for a method that is the fairest way of rolling out the programme.

Realising that due to capacity limitations, not all areas in a district can be reached in one year, this provides a huge window of opportunity to conduct baseline and impact studies that are scientifically rigorous to produce more evidence needed to argue for fiscal sustainability.

Recognising the importance of fairness and transparency in the selection of areas to take part in the baseline and follow up surveys for the social cash transfers in our respective districts, it has been decided to randomly assign the areas. These areas will later be

divided into treatment group and control group. The treatment group will be the first ones to receive the social cash transfers whilst the control group will be the last ones to start receiving.

Having randomly assigned the areas, we the undersigned having gathered, this day of Thursday the 10th of June, 2010 in the Ministerial conference room at the Ministry Headquarters in Lusaka do hereby append our signatures as a testament of the selection procedure used. This meeting to randomly select the CWACs was approved by the Permanent Secretary of the Ministry.

Name	Title
1. Rose N. Motopo	DSW – Headquarters
2 Chinda Mwila	Social Welfare Officer Luwingu
3 Manzunzo Zulu	DSWO Mkuze
4 Telas Phiri	DSWO Shangombo
5 Bestone Mbozi	SSWO - HQ
6 Dorica Nkhama	SWO (SCT) - HQ

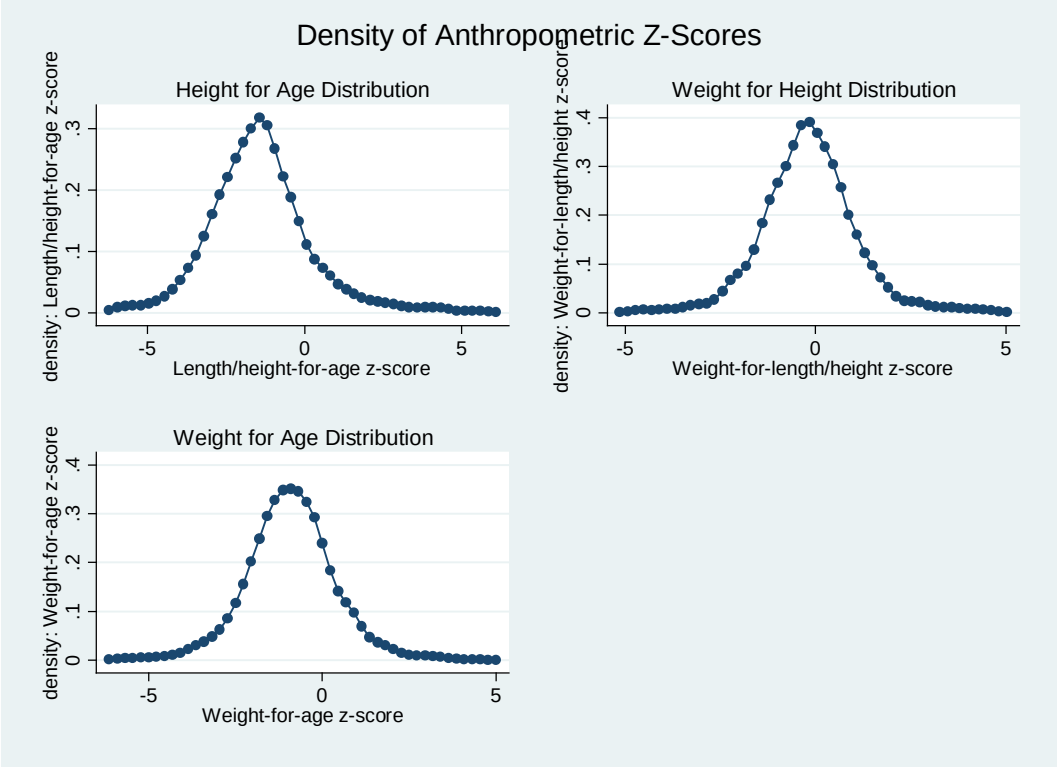
	Name	Title	
7	GEORGE L. AKAYOMBOKWA	P.S.W.O-WP	
8	SIAMBWELA SIAMALWA - SSWO - CP		
9	WINNIE NAMONJE	— ASWO — SERENJE	
10	Weka N. Banda	- Senior Planner	
11	Roselyn M Imalaa	- DSWO - Kalabo	
12	Kandunda Arcleo K	DSWO - Kapuka	
13	BRIGHTON BWACHA	CONSULTANT SCT.	
14	ROYA TEMBO	PSWO - NORTHERN	
15	S. MICHELO	CSWO	
16			
17			
18			
19			
20			

Appendix B: Assessment of Anthropometric Measurements and Comparison with National Data

Height and weight of young children are difficult to measure in large-scale field studies such as this, but if done well, these are among the true measures of actual human development for young children. In this Appendix we briefly assess the quality of the anthropometric data because this will be a key impact indicator in the evaluation.

Raw heights (cms) and weights (kgs) are converted to z-scores using the new WHO growth charts that were released in 2007. The distribution of z-scores captured in field studies may shift left or right depending on the overall nutritional status of the study population, but the overall shape of the distribution, and the spread, should be the same as in the reference charts, that is, a normal distribution with a standard deviation of approximately one. The graph below shows the distribution of the distribution of the three indicators and these do indeed display a normal distribution, although height-for-age and weight-for-age are noticeably shifted to the left. In addition, the spread of the distribution appears to be greater than one, and this is confirmed in Table B1, which shows the means and standard deviations (SD) of the actual z-scores for each indicator.

Figure B1: Distribution of Z-scores



The first column of Table B1 shows these summary statistics for all children younger than 60 months. The SD is especially large for height-for-age (HAZ) at 1.63 and smallest for weight-for-height (WHZ). In addition, the percentage of observations that are flagged, that is, that are found to be outside the biologically plausible range, is also highest for HAZ at 8.5 percent but only around 2.3 percent for the other two indicators. This suggests that data quality is poorest for HAZ. We have compared these statistics to the raw anthropometric scores in the DHS and found that in each of the three cases the SD is much larger in the DHS but the percent flagged is lower. This suggests that there are many more borderline cases in the DHS which fall just within the cut-off range and so are considered valid observations and contribute to the (higher) SD, but which obviously bring down the overall mean and proportion below the -2 z-scores threshold.

Height and weight measurements can be particularly difficult for very young children. The next two columns in Table B1 report summary statistics for children younger than 24 months and older children. The SD decreases only slightly among older children for HAZ and the percentage flagged also declines only slightly. In contrast, the SD for the other two indicators declines significantly among the older sample and the percentage flagged is halved for WHZ. We conclude that measurement error due to age is more predominant for WHZ and weight-for-height (WAZ) (more measurement error at younger ages), but overall data quality is good for these two indicators. However, there appears to be a larger amount of measurement error in HAZ relative to WHZ and WAZ, and this measurement error does not vary by age. Again, we compared these statistics with the same age group from the DHS. Like the CGP data, the DHS data quality is also poorer for younger children, and the pattern noted above for the full sample continues to hold for the sample under age 24 months—higher SD in the DHS but lower percent of observations flagged.

Table AX: Anthropometric Z-Scores by Age Group

	Age < 60 Months		Age < 24 Months		Age 24–59 Months	
	Mean	SD	Mean	SD	Mean	SD
Height for Age	–1.42	1.63	–1.31	1.67	–1.49	1.60
N	3479		1432		2047	
percent flagged	8.5		10.1		7.4	
Weight for Height	–0.172	1.24	–0.302	1.33	–0.082	1.17
N	3470		1431		2039	
percent flagged	2.4		3.4		1.7	
Weight for Age	–0.908	1.27	–0.871	1.36	–0.938	1.20
N	3946		1763		2183	
percent flagged	2.3		2.9		1.7	

The following three tables compare anthropometric z-score indicators from the ZDHS 2007 with those from this study for comparable age groups. The overall stunting rate (proportion below -2 z-scores) is higher in the national sample (45 versus 35 percent) and the mean z-score is correspondingly lower. Part of this is because the age distribution of children in the CGP is younger and HAZ worsens with age. The difference in stunting is very small at the two youngest age groups and is largest in the 12- through 47-month age group. For the indicators of wasting (WHZ < –2) and underweight (WAZ < –2), the ZDHS and CGP estimates are much more comparable, with a slightly higher levels of underweight and wasting. Note that the age distribution of underweight is very different in the CGP, with high levels of underweight even among very young children, unlike in the ZDHS.

Height for Age and Stunting Comparison

	ZDHS 2007		CGP	
Age	% below -2 SD	Mean Z-Score	% below -2 SD	Mean Z-Score
< 6	20.0	–0.5	15.6	–0.5
6–8	26.0	–0.9	23.8	–0.9
9–11	32.6	–.9	22.9	–1.1
12–17	43.7	–1.6	37	–1.5
18–23	59.2	–2.2	40.1	–1.6
24–35	54.8	–2.0	38.1	–1.5
36–47	51.7	–2.0	36.7	–1.5
48–59	46.9	–1.9	36.9	–1.5
ALL	45.7	–1.7	35.2	–1.4

Age is listed in months. ZDHS is the Zambia Demographic and Health Survey.

Weight for Height and Wasting Comparisons

	ZDHS		CGP	
	% below -2 SD	Mean Z-Score	% below -2 SD	Mean Z-Score
< 6	8.2	0.4	9.2	0.1
6–8	8.2	0.2	9.1	–0.1
9–11	12.9	–0.1	13.2	–0.3
12–17	8.8	–0.1	7.6	–0.4
18–23	5.4	0.2	8.5	–0.4
24–35	5.1	0.3	5.2	–0.1
36–47	2.2	0.4	2.7	0
48–59	4.1	0.2	4.2	–0.2
ALL	5.8	0.2	6.2	–0.2

Weight for Age and Underweight Comparisons

	ZDHS		CGP	
	% below -2 SD	Mean Z-Score	% below -2 SD	Mean Z-Score
< 6	6.2	0.1	16.2	–0.5
6–8	9.9	–0.4	12.4	–0.7
9–11	15.7	–0.8	16.3	–0.8
12–17	15.5	–0.9	19.1	–1
18–23	19.2	–1.0	21.4	–1.1
24–35	17.4	–0.9	15.4	–0.9
36–47	13.8	–0.9	13.2	0
48–59	15.2	–1.1	18.1	–1.1
ALL	14.5	–0.8	16.5	–0.9

Figure A2 below shows the distribution of height-for-age z-scores for the CGP and DHS samples. This graph shows that the CGP distribution is shifted slightly to the right, but that the main difference in the distribution is between -2 and 0 z-scores where there are proportionately more CGP children than DHS children. Indeed the proportion of children with z-scores below 0 is actually the same in both data sets.

Figure A2

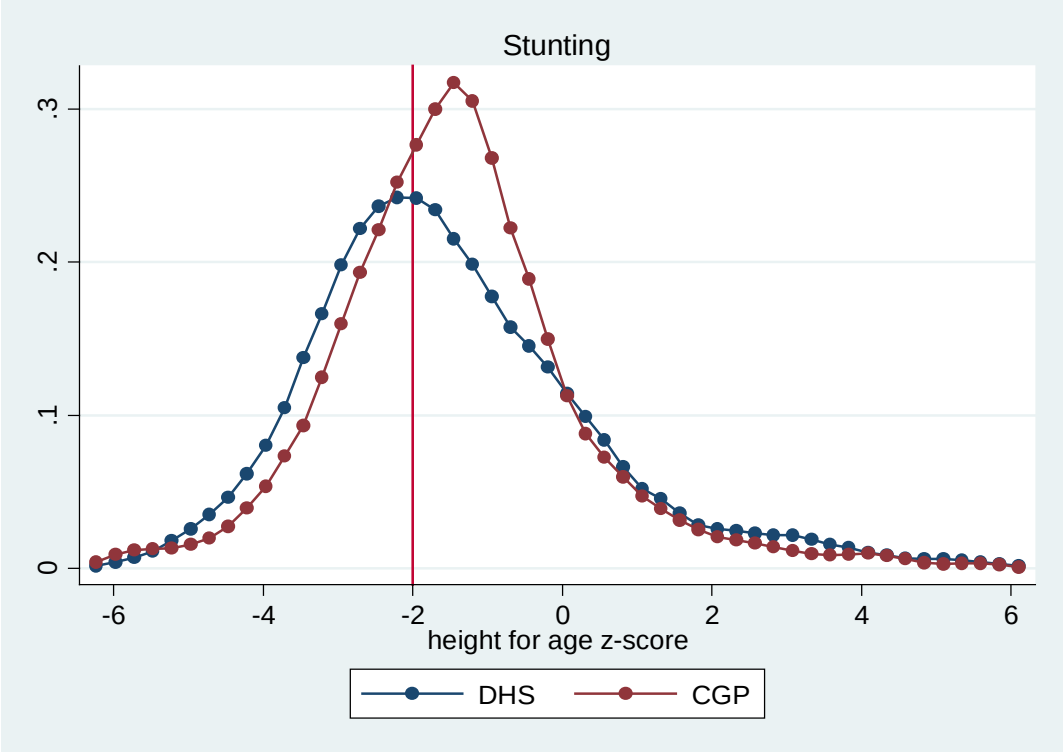
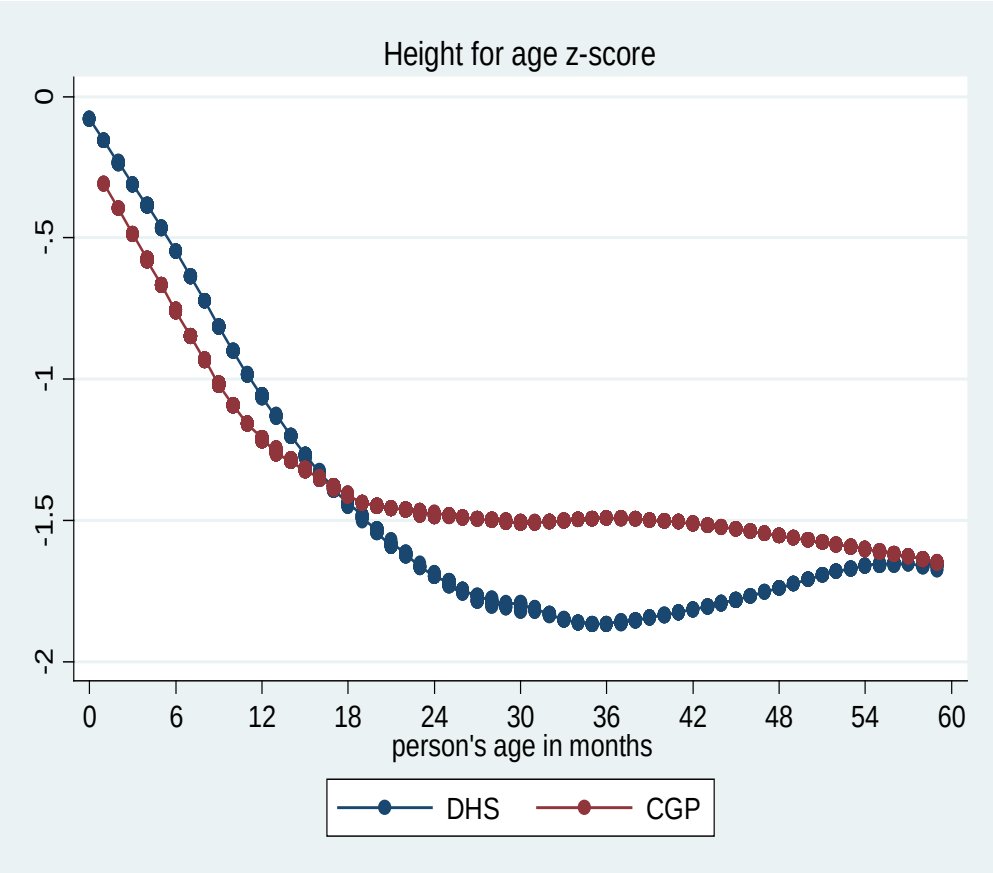


Figure A3 shows the distribution of height-for-age z-scores by age (in months) of the child. Here we see clearly that up to about 20 months of age z-scores in the CGP are below those in the DHS indicating that CGP are worse off nutritionally. It is only beyond 20 months that this trend is reversed, and children in the DHS appear most advantaged relative to CGP between ages 2 and 4 years of age.

We speculate on two possible reasons for this sudden reversal in chronic nutritional outcomes between the two surveys. CGP eligibility rules favor families with children under age 3, thus providing an incentive for families to under-report the birth date (and thus age) of their children. This under-reporting would occur among older children and would lead to the pattern of z-scores shown in Figure A3. A second possible explanation could be mortality selection. CGP households are poorer and more chronically food insecure. Higher mortality beyond 18 months, whereby les healthy children (those with lower z-scores) were more likely to die, could also lead to the pattern in Figure A3. Both the DHS and CGP surveys collect data on child death. Among comparable women from both surveys, the mean number of child deaths per woman is three times larger in the CGP relative to the DHS. This of course is consistent with the targeting strategy of the CGP as well, which selected districts with high rates of poverty and infant and child mortality.

Figure A3



We summarize our assessment of the anthropometric data in the CGP and the seemingly inconsistent result that child nutritional status is better among CGP households even though these households are poorer, more food insecure, and show worse child outcomes in other areas.

The SD of z-scores is lower in the CGP relative to DHS but the percent flagged is higher. Thus, there are more DHS observations just within the valid range, which increased the SD and the proportion malnourished, but reduces the percent flagged. Data quality appears to be slightly worse for younger children in both surveys (as is typical in field surveys) butt the pattern of SD and flags is the same. In terms of chronic nutritional status (height-for-age), CGP children are actually worse off relative to DHS up to 20 months, but then suddenly show better nutritional outcomes. We have suggested two possible reasons for this unusual pattern, that parents may under-report the age of older children to maintain program eligibility, or higher mortality selection among CGP families. The latter hypothesis is consistent with evidence from other parts of the survey showing that mean child deaths per woman is much higher in the CGP relative to comparable DHS women.

While there are some plausible explanations for why CGP anthropometric indicators (at least for older children) are better than ZDHS, this does not invalidate the impact evaluation results for nutritional status *per se*. This is because the children will be compared longitudinally, that is, relative to their own initial starting point, to assess changes in *growth* rather than levels of nutrition. And since the control group has been measured using the same personnel and equipment, any systematic measurement error, if it existed, would be cancelled out in the statistical analysis.

Appendix C: Community Characteristics

Appendix C discusses basic characteristics of the communities within the Child Grant cash transfer program using survey data obtained during baseline collection in 2010. The sections of this appendix review the basic summary statistics of the communities in relation to governance, social capital, and economic activity and shocks.

A community survey was administered throughout the three remote Zambian districts included in the program: Kaputa, Kalabo, and Shangombo. The survey was administered by a team of Zambian enumerators experienced in household surveys and fluent in the local language who were instructed to interview key informants from among the following: the village head, Area Coordinating Committee/CWAC members, government officials, and NGO workers.

Within the three districts there are a total of 34 Community Welfare Assistance Committees (CWACs) that are grouped into 80 smaller communities, leaving an average of just over 2 communities per CWAC. The median population of these communities is 1099, and the median number of households is 226 households.[21]

Governance

Table C.1 shows the descriptive statistics of selected characteristics of governance within each community. Just less than half (49.4%) of the communities report having representation in an Area Coordinating Committee (ACC) or Community Development Committee, although the majority (85.9%) report having an elected executive committee. On average, there are 8.77 members in each committee, with an average total of 3.8 female members per committee (not shown). Over 90 percent of CWAC chairpersons are male, despite nearly half of total number of members in committee are female. Community leaders report meeting regularly at a higher rate (43.8%) than CWAC committees (37.5%). However, the majority of both meet irregularly or never.

Table C.1: Governance

VARIABLES	(1) N	(2) Mean
Has representation in the local ACC or Community Development Committee	79	0.494
Has an elected executive committee	78	0.859
Gender of CWAC chairperson is male	75	0.933
CWAC committee meets regularly	80	0.375
Community leaders meet regularly	80	0.438

[21] Due to outliers in the data for both population and number of households within each community, the medians were reported for both indicators.

Social Capital

Table C.2 shows the proportion of NGOs active in the community. Catholic Relief Services (CRS) and the Wildlife Conservation Society (WCS) are represented in the most communities (6.25%), followed by Program Against Malnutrition (PAM) and Campaign for Female Education (CAMFED) (3.75%), and World Vision International (WVI), Adventist Development and Relief Agency (ADRA), and the Henwood Foundation (1.25%). There are a total of seven large NGOs listed in the questionnaire that are not represented in any of these rural communities: Oxfam GB, Plan International, Care International, Cooperative League for the USA (CLUSA), Maureen Mwanasawa Community Initiative (MMCI), and Lutheran World Federation (LWF). Out of the aforementioned NGOs, just 20 percent of all communities have at least one active in the community.

Table C.2: NGOs

VARIABLES	(1) N	(2) Mean
Program Against Malnutrition (PAM)	80	0.0375
World Vision International (WVI)	80	0.0125
Oxfam GB	80	0
Plan International	80	0
Care International	80	0
Cooperative League for the USA (CLUSA)	80	0
Maureen Mwanasawa Community Initiative (MMCI)	80	0
Catholic Relief Services (CRS)	80	0.0625
Adventist Development and Relief Agency (ADRA)	80	0.0125
Lutheran World Federation (LWF)	80	0
Wildlife Conservation Society (WCS)	80	0.0625
Henwood Foundation	80	0.0125
Campaign for Female Education (CAMFED)	80	0.0375
Any NGO in community	80	0.200

Table C.3 shows the proportion of active clubs in the communities. Football (51.2%), Farmer's/Agro (30%), and Women's clubs (26.3%) are the highest represented groups in the communities. This is followed by drama clubs (10%), peer educators (8.75%), and netball clubs (2.5%). Fishery, beekeeper's, credit, and nutrition support clubs are each active in only 1.25 percent of the communities. Of these aforementioned clubs, 65 percent of communities have at least one active.

Table C.3: Clubs

VARIABLES	(1) N	(2) Mean
Farmer's/Agro club	80	0.300
Fishery club	80	0.0125
Beekeeper's club	80	0.0125
Women's club	80	0.263
Credit club	80	0.0125
Peer Educators	80	0.0875
Drama club	80	0.100
Football club	80	0.512
Netball club	80	0.0250
Nutrition support club	80	0.0125
Any clubs in village	80	0.650

Economic Activity and Shocks

Table C.4 reports the economic activities of the community as described by the interviewees. Over 80 percent of communities report crop farming as the usual main economic activity in the village, which is typical for the region. The survey data also report the average daily wage for men as well as women in the villages. The median daily wage for men and women is 6250 Kw and 5000 Kw, respectively[22], or just over 1 USD daily. Overwhelmingly, communities report that children under the age of 16 work for money (92.4%), with 56 percent of those reporting domestic work or farming as the primary form of labor. Of the villages where children work, 63 percent report that half or more of the children in the village participate in some form of work for money.

Table C.4: Economic activities

VARIABLES	(1) N	(2) Mean
The main economic activity in village is farming crops	80	0.813
Children under age of 16 work in village	79	0.924
Of villages where children work, children usually perform domestic work or farming	73	0.562
Of villages where children work, majority of child population works	73	0.630

[22] Outliers in the data result in the mean wage well over what would be expected (approx. 14000 Kw women 16000 Kw men). Therefore, the median wage is used.

Table C.5 reports the beneficial shocks to the community over the five years prior to the survey administration. According to the data, school construction, development projects, and health facility construction occurred in the most villages (27.5%, 18.8%, and 13.8%, respectively), while road construction and new employment opportunities were reported in very few villages (8.75% and 5%, respectively). Despite these low individual rates, nearly 50 percent of villages reported at least one of these beneficial external shocks to have occurred over the previous five years.

Table C.5: Good external shocks, last 5 years

VARIABLES	(1) N	(2) mean
School constructed	80	0.275
Road constructed	80	0.0875
Health facility constructed	80	0.138
New employment opportunity available	80	0.0500
Development projected started	80	0.188
Any beneficial external shock	80	0.438

Table C.6 reports the proportion of villages that experienced detrimental shocks in the five years prior to the survey. Very few villages report having loss of key social services (6.25%) or massive job lay-offs (3.75%), but this is likely due to the lack of social services and job opportunities available prior to this period. However, over 50 percent have experienced sharp changes in prices, human epidemics, and crop disease and even more have experienced livestock disease (86.3%), flooding (81.3%) and drought (73.8%). Nearly every village reported at least one negative external shock over the previous five years.

Table C.6: Bad external shocks

VARIABLES	(1) N	(2) mean
Loss of key social services	80	0.0625
Massive job lay-offs	80	0.0375
Sharp changes in prices	80	0.525
Human disease/epidemic	80	0.563
Livestock disease	80	0.863
Crop disease	80	0.600
Flood	80	0.813
Drought	80	0.738
Any negative external shock	80	0.988

Appendix D: Health Facilities

Appendix D discusses the basic characteristics of the primary health facilities within the Child Grant cash transfer program using survey data obtained during baseline collection in 2010. The sections of this appendix review the basic summary statistics of the facilities in relation to characteristics and equipment, services and drugs, and personnel.

A health facility survey was administered to each primary health facility as well as Neighborhood Health Committee (NHC) throughout the three districts included in the program. Tertiary care facilities, such as local, district, or regional hospital were excluded. Although NHCs were included in this survey, these observations should not be considered health facilities, per se, but are meant to supplement services to those in particularly remote regions. NHCs are comprised of villagers who volunteer to serve on a committee that aims to provide health information to the community. NHC members are trained by the clinic on basic health information and serve as a connection to the clinic for the community. They are not qualified to provide healthcare nor do they distribute health supplies other than condoms, chlorine for water, and Tylenol. NHCs function out of their house and do not have a facility associated with them. A total of ten NHCs were included in the survey. These NHCs served eight communities with 223 households; all communities are within the district of Kalabo.

Characteristics and Equipment

A total of 31 health facilities serve the three rural districts of Zambia that are included in this study. Of these facilities 38.7 percent are health centers, 38.7 percent are health posts, and 12.9 percent are dispensaries (two facilities were not classified). All facilities were constructed between 1957 and 2010; however, the median year is 1996 with the majority of construction occurring after 1990. The characteristics of these facilities are typical of developing regions, with only six percent of all facilities having electricity or an operating room, less than ten percent use a protected water source (none have access to public or private taps), and approximately three percent have an operating room. Roughly one in four facilities have a laboratory for conducting tests and 32 percent provide housing for employees; only 13 percent report having at least one vehicle.

Services and Drugs

Table D.1 shows available services provided by the 31 health facilities. Over 90 percent of facilities offer well-baby services and nearly as many offer antenatal services (87.1%). Three in four facilities offer family planning services and roughly the same percent have participated in a child health day or immunization campaign during the six months prior to the survey. Outpatient services are offered by 67 percent of all facilities; nearly 50 percent offer obstetric

services, but less than 40 percent offer either mobile clinics or treatment for acute malnutrition for children.

Table D.1: Services

VARIABLES	(1) N	(2) mean
Outpatient consultations	31	0.677
Obstetric	31	0.484
Well-baby clinic	31	0.935
Antenatal	31	0.871
Family planning	31	0.774
Mobile clinic	31	0.387
Treatment for acute malnutrition for children	31	0.387
Child health day/ immunization campaign	31	0.742

Table D.2 shows available testing for the health facilities. The tests that are available at the highest percentage of facilities are rapid diagnostic tests (RDTs) for malaria (35.5%) and HIV tests (32.3%). Malaria parasite slide (MPS) tests are conducted at 19 percent of facilities and rapid plasma reagin (RPR) tests for syphilis are available at 19 percent of facilities as well. Pregnancy tests are performed at 16 percent of facilities, while urine tests are conducted at slightly fewer facilities (12.9%). A very small percentage of facilities offer stool test or skin snip tests (3.23% and 6.45%, respectively).

D.2 Testing

VARIABLES	(1) N	(2) mean
Stool tests	31	0.0323
Blood tests for malaria-RDT	31	0.355
Blood tests for malaria-MPS	31	0.194
HIV tests	31	0.323
Pregnancy tests	31	0.161
Urine tests	31	0.129
Skin snip tests	31	0.0645
RPR tests for syphilis	31	0.194

Table D.3 shows the proportion of facilities that normally carry certain drugs or supplies, followed by the percentage that actually had that item in stock at the time of the survey. Although three out of four facilities normally carry insecticide treated mosquito nets, less than half had them in stock during the interview. Vaccines were slightly more likely to be in stock at the time of interview as compared to the percentage that normally carried them, but these

basic immunizations were available at a minority of facilities, especially for meningitis. Only one quarter of facilities claimed that they normally carried antiretrovirals, and slightly fewer had them in stock. Cotrimoxazole and penicillin, used to treat infections, were actually available at the time of the survey in approximately 23 percent of the facilities. Folic acid tablets were available in nearly as many facilities as normally carry them, although this number is still below 50 percent. Both fansidar and coartem (common malaria treatments) were unavailable in the majority of facilities, although over half of the facilities claimed they normally carried both of these drugs. Oral rehydration salts (ORS) were available in only 45 percent of facilities, but are normally carried in 68 percent. This is an exceptionally inexpensive item that helps to treat diarrheal disease, which is one of the leading causes of child mortality in developing regions. Although three-quarters of facilities normally carry aspirin or paracetamol, which are most commonly used to treat minor pain and fever, less than forty percent actually have either item in stock. Of the modern methods of contraception available, the most notable item is condoms; although just over 80 percent normally carry them, only 55 percent had them in stock at the time. The average number of drugs carried by facilities is 9.5; however, the amount in stock at the time of the survey was around 3 items fewer, on average.

D.3: Drugs		Carry	In Stock
VARIABLES	(1) N	(2) mean	(2) mean
Insecticide treated mosquito nets	31	0.774	0.452
Meningitis vaccines	31	0.0968	0.0323
Polio vaccines	31	0.419	0.290
Measles vaccines	31	0.419	0.355
Tetanus vaccines	31	0.419	0.355
DPT vaccines	31	0.387	0.323
BCG vaccines	31	0.419	0.258
Antiretrovirals	31	0.258	0.226
Cotrimoxazole	31	0.387	0.226
Penicillin injection/tablets	31	0.258	0.194
Folic acid tablets	31	0.581	0.452
Fansidar	31	0.613	0.387
Coartem	31	0.516	0.258
Oral rehydration salts	31	0.677	0.452
Aspirin	31	0.742	0.355
Paracetamol/Panadol	31	0.774	0.355
Intrauterine devices	31	0.258	0.161
Contraceptive pills	31	0.581	0.452
Spermicide	31	0.129	0.0645
Condoms	31	0.806	0.548
Total number of supplies/medication	31	9.516	6.194

Personnel

The following table D.4 shows the percentage of facilities with full-time and part-time personnel, as well as any personnel, by type of staff. There are no full-time medical doctors at any of the facilities, and only 3.2 percent of facilities have at least one part-time medical doctor on staff. There are no physiotherapists or medical assistants at any of the facilities and very few facilities have a pharmacist, a pharmaceutical attendant, or a lab technologist at full or part time (3.23% of facilities have at least one of each type of personnel on staff). Only 6 percent of all facilities have a full or part time medical aide, and just under ten percent have at least one registered nurse on staff. However, 16 percent have a medical assistant, midwife, or laboratory scientist on staff, and nearly 20 percent have an enrolled nurse at full or part time. Approximately one in four facilities has at least one classified daily employee on staff. Of all 31 facilities, a total of 14 report having no full or part time employees (not shown).

Table D.4: Personnel

		Part-time	Full-time	Any
	(1)	(2)	(2)	(2)
VARIABLES	N	mean	mean	mean
Medical doctors	31	0.0323	0	0.0323
Assistant medical doctors	31	0.0968	0.0968	0.161
Medical assistants	31	0	0	0
Medical aides	31	0.0323	0.0323	0.0645
Registered nurses	31	0.0645	0.0323	0.0968
Enrolled nurses	31	0.161	0.161	0.194
Midwives or nurse midwives	31	0.129	0.0968	0.161
Pharmacists	31	0	0.0323	0.0323
Physiotherapists	31	0	0	0
Pharmaceutical attendants/assistants	31	0.0323	0	0.0323
Laboratory technologists	31	0.0323	0	0.0323
Laboratory scientists	31	0.0645	0.0968	0.161
Classified daily employees (CDE)	31	0.161	0.161	0.258

Appendix E: complete list of baseline comparisons between treatment and control groups.

Household Level Comparisons

Variables	Control	SD1	N1	Treatment	SD2	N2	Mean difference	T-value
Outcome variables								
Expenditures on food per capita	29262.93	25978.72	1287	30839.84	27258.14	1228	-1576.91	-1.49
Foodshare pc	0.72	0.15	1287	0.72	0.15	1226	0.00	-0.24
Cereal share	0.31	0.26	1287	0.34	0.27	1224	-0.04**	-3.45
Roots/tubers share	0.17	0.24	1287	0.15	0.22	1224	0.02*	2.41
Pulses/legumes share	0.03	0.08	1287	0.03	0.06	1224	0.00	1.09
Fruits/vegetables share	0.23	0.19	1287	0.21	0.16	1224	0.02*	2.53
Meat/poultry/fish share	0.18	0.17	1287	0.18	0.16	1224	-0.01	-1.20
Total household expenditure percapita	39485.32	31556.90	1287	41420.80	33132.16	1228	-1935.47	-1.50
severely food insecure	0.90	0.30	1274	0.90	0.30	1218	0.01	0.44
moderately food insecure	0.07	0.25	1287	0.08	0.27	1225	-0.01	-1.11
Control variables								
Household size	5.65	2.05	1287	5.75	2.18	1228	-0.10	-1.18
Number of people ages 0 - 5	1.93	0.74	1287	1.88	0.80	1228	0.04	1.44
Distance to food market	21.46	29.50	848	14.79	24.68	819	6.67**	5.01
Distance to health facility	9.40	12.29	1175	9.32	9.41	1113	0.08	0.18
Household recieved a farm input subsidy	2.00	0.06	1286	2.00	0.07	1226	0.00	0.71
Household recieved a food security pack	0.00	0.05	1286	0.00	0.07	1226	0.00	-1.06
Household affected by drought	0.06	0.23	1287	0.04	0.21	1228	0.01	1.20
Household affected by flood	0.07	0.26	1287	0.03	0.18	1228	0.04**	4.54
Household affected by any shocks	0.20	0.40	1287	0.18	0.38	1228	0.02	1.34

Child Comparisons and Development Scale Scores

Variables	Control	SD1	N1	Treatment	SD2	N2	Mean difference	T-value
Outcome variables								
Height	-1.15	1.46	1752	-1.11	1.43	1607	-0.04	-0.73
Weight	-1.22	1.36	1860	-1.29	1.36	1725	0.07	1.44
Weight for height	-0.49	1.36	1755	-0.54	1.34	1624	0.04	0.94
Health Card	0.93	0.26	2171	0.95	0.22	2034	-0.02**	0.03
Vitamin A dose in the last 6 months?	0.76	0.43	1846	0.79	0.40	1757	-0.03*	-2.45
Diarrhea in the past 2 weeks?	0.17	0.38	2177	0.20	0.40	2039	-0.03*	-2.40
Ill with fever in the last 2 weeks?	0.23	0.42	2188	0.24	0.42	2055	-0.01	-0.68
Development scales for children 3-7 years old								
Played with items	1.49	0.75	1594	1.53	0.78	1475	-0.05	-1.67
Care scale - Family engagement activities	2.49	2.22	1594	2.39	2.21	1475	0.10	1.21
Various skills/behaviors	4.41	2.13	1594	4.46	2.18	1475	-0.05	-0.62
Control variables								
Age (in months)	27.32	16.63	2207	26.74	16.32	2076	0.58	1.15
Gender (male)	0.50	0.50	2478	0.48	0.50	2310	0.02	1.57
Highest grade level of primary care giver	3.69	3.17	2478	4.13	3.38	2314	-0.44**	-4.69
BCG vaccine	0.96	0.20	2175	0.96	0.19	2044	0.00	-0.71
Oral Polio Vaccine (OPV)	0.96	0.20	2173	0.95	0.21	2039	0.00	0.22
DPT vaccine	0.95	0.23	2169	0.95	0.22	2033	0.00	-0.33
Measles injection	0.81	0.39	2174	0.82	0.38	2037	-0.01	-0.93

Child Baseline Comparison

Variables	Control	SD1	N1	Treatment	SD2	N2	Mean difference	T-value
Age in years	10.80	3.66	2290	10.64	3.57	2301	0.15	1.43
Female	0.51	0.50	2290	0.50	0.50	2301	0.02	1.05
orphan from Mom	0.09	0.29	2290	0.08	0.27	2301	0.01	1.26
orphan from Dad	0.19	0.39	2290	0.16	0.37	2301	0.02*	2.02
OVC	0.24	0.43	2290	0.21	0.41	2301	0.03*	2.17
Mneed	0.77	0.42	2290	0.80	0.40	2301	-0.03*	-2.45
ever enrolled in school	0.73	0.44	2281	0.73	0.45	2290	0.00	0.05
currently enrolled in school	0.64	0.48	2281	0.64	0.48	2290	0.00	0.27
full attendance in prior week	0.80	0.40	1414	0.78	0.41	1424	0.02	1.15
Behind	2.56	1.53	1335	2.47	1.50	1357	0.09	1.49
paid or unpaid work	0.56	0.50	2239	0.59	0.49	2265	-0.03*	-2.11
# unpaid hrs L2 weeks	23.36	23.23	1218	21.33	21.77	1319	2.03*	2.26

Women's Empowerment and Expectations Baseline Comparison

Variable	Control	SD1	N1	Treatment	SD2	N2	Mean difference	T-value
Women empowerment scale	6.56	3.60	1265	6.43	3.50	1217	0.14	0.96
1 year	0.54	0.51	1285	0.52	0.54	1219	0.02	0.91
2 year	0.56	0.51	1286	0.56	0.54	1223	0.00	-0.13
3 year	0.62	0.50	1284	0.63	0.53	1224	-0.01	-0.37
Person's age in years	29.68	9.50	1287	30.04	9.65	1228	-0.37	-0.96
Twohundred	0.17	0.37	1287	0.15	0.36	1222	0.01	0.97
Threehundred	0.52	0.50	1286	0.56	0.50	1223	-0.04	-1.84
Fourhundred	0.64	0.48	1286	0.68	0.47	1224	-0.03	-1.76
Sixhundred	0.73	0.44	1286	0.78	0.42	1224	-0.04	-2.41*
Eighthundred	0.77	0.42	1283	0.80	0.40	1222	-0.03	-1.98*

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