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Baseline Report for the Impact Evaluation of Zambia's First 1,000 Most Critical Days Programme

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Contributors

The impact evaluation of the First 1,000 Most Critical Days Programme (MCDP) is being conducted by American Institutes for Research (AIR) for the government of Zimbabwe, under contract to the Department for International Development (DfID). The Principal Investigators for the overall evaluation are David Seidenfeld (American Institutes for Research), Terry Roopnaraine, and Gelson Tembo (Palm Associates). The overall team leaders of this report are David Seidenfeld (AIR) and Gelson Tembo, but many others made important contributions and are listed below by institutional affiliation and alphabetical order within institution:

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David Seidenfeld, Ph.D.
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List of Acronyms

AIR	American Institutes for Research
ARI	Acute Respiratory Illness
CGP	Child Grant Programme
DfID	Department for International Development
DHS	Zambia Demographic and Health Survey
IYCF	Infant and Young Child Feeding
MCDMCH	Ministry of Community Development Mother and Child Health
MCDP	First 1,000 Most Critical Days Programme
NFNC	National Food and Nutrition Commission
RQA	Rapid Qualitative Assessment
SEA	Standard Enumeration Areas
UNC	University of North Carolina at Chapel Hill
WHO	World Health Organisation

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Executive Summary

This report provides the baseline results of the impact evaluation of Zambia's First 1,000 Most Critical Days Programme (MCDP). The evaluation of the MCDP will be a two year mixed methods non-experimental design that includes three components: a rapid qualitative assessment (RQA), a process evaluation, and an impact evaluation. The purpose of the evaluation is to learn if and how the programme impacts the lives of pregnant women, and children under 2 years old for an array of outcomes including young child nutrition; health, water and sanitation practices; and the use of health related services. Department for International Development (DfID) Zambia contracted the American Institutes for Research (AIR) and its partners Palm Associates and the University of North Carolina at Chapel Hill (UNC) to conduct the evaluation of the MCDP.

The primary goals of this baseline report are to describe the approach to identification, describe the sample of eligible households before they receive the programme, and check for equivalence between the treatment and comparison groups. Describing the sample at baseline helps stakeholders assess if they have accurately targeted the type of people they want to benefit from the programme. Additionally, it helps stakeholders understand where beneficiaries need more assistance and how best to design the programme to meet beneficiary needs. In addition to describing the sample, we also investigate baseline equivalence. We care about baseline equivalence because it helps assess the internal validity of the study (i.e. the ability of the study to attribute causality to the programme when differences are observed between the treatment group and the comparison group at the end of the study), and tells us what factors we need to control for in our analysis of impacts.

Study Design of the Impact Evaluation: For the impact evaluation we will compare households with children under two years old from the two treatment districts of Chipata and Mbala that are eligible for the MCDP to households in the two comparison districts of Katete and Nakonde that do not receive the programme during the period of study but that are eligible for the programme. The comparison districts were selected by the NFNC, CARE, and the research team to be similar to the treatment districts by agro-ecological characteristics, culture, level of child morbidity and malnutrition, and level of development. We will use a difference-in-differences framework to control for observed differences and time-invariant unobserved differences between treatment and comparison groups at baseline. The longitudinal impact evaluation includes 1,200 households with children under two years old in twelve wards across four districts with half in the treatment sample of Chipata and Mbala and half in the comparison sample of Katete and Nakonde.

The Sample: We describe the sample for the study by presenting household, maternal, and child characteristics of beneficiary households. Basic household characteristics, such as household size, access to clean water, and proper sanitation, or individual-level characteristics like mother's age or education, are important as they could influence child nutrition but will not be affected by the programme. We find from the baseline survey that the programme enrols small families (median size of six people) where a large majority of the mothers are married (80 percent) and caring for young children. Mothers have an average of just over four years of education, meaning most did not complete primary school. Households are food insecure (34 percent severely food insecure), very poor (98 percent), and many do not have access to clean water (67 percent no access to clean water) or a latrine (94 percent do not have a latrine). These characteristics affect child nutrition, however they are not directly addressed by the MCDP programme; thus, these characteristics could pose a challenge for the MCDP to positively impact child nutrition. As an example, results from the Child Grant Programme (CGP) cash transfer evaluation found that the programme only has an impact on child nutrition for households with access to clean

water. This result makes sense in that it is difficult for additional food and a better balanced diet to help a child's nutritional status if the child is continually sick with diarrhoea and unable to properly absorb the additional food. Thus, the benefits of the cash transfer programme are lost to the negative effect of unclean water. This same result could occur in the MCDP since access to clean water and sanitary latrines are a problem.

Outcomes of Interest: We report on four domains of outcomes of interest to the programme: mother's knowledge of feeding and hygiene practices, mother's behaviour for feeding and hygiene practices, child health, and child nutrition. We find that mothers know about proper feeding with respect to frequency, but many do not know about diet diversity and how breastfeeding relates to HIV prevention/protection. Similarly, we find that mothers have proper practices for the frequency and duration of breastfeeding, but do not practice diet diversity for young children or initiate breastfeeding at the right time. Findings suggest that the MCDP should focus efforts on mother's knowledge and practice of diet diversity, initial breastfeeding, and HIV prevention. With regards to children's health, we find that many mothers are good about seeking treatment for their infant when s/he is sick, however less than half of the children under two years old have been vaccinated. Therefore, we suggest that the MCDP focus efforts on messaging to mothers about the importance of vaccinating their children at the appropriate age. Last, we find that stunting is a fairly large problem among children under two years old in the population (34 percent). All of the interventions in the MCDP package can ultimately affect stunting, so this indicator will be important to track over time with the hope of seeing some improvement (given the caveats mentioned above about moderators that may challenge the programme's ability to bring about changes in stunting).

Baseline Equivalence: In addition to describing the sample, we also investigate baseline equivalence. We care about baseline equivalence purely as a technical aspect of the study design because it helps assess the internal validity of the study (i.e., the ability of the study to attribute causality to the programme when differences are observed between the treatment and comparison groups at the end of the study), and tells us what factors we need to control for in our analysis of impacts. We find that for the most part the comparison group serves as a good counterfactual because the samples are very similar across domains of interest to the programme, both in outcome indicators and demographic characteristics that are associated with outcomes of interest. The differences that we observe between the groups are relatively small and are statistically different as a result of our large sample size. We can control for these small differences in our analysis and believe that they are not a threat to the internal validity.

I. Introduction

This report provides the baseline results of the impact evaluation of Zambia's First 1,000 Most Critical Days Programme (MCDP). The evaluation of the MCDP will be a two year mixed methods non-experimental design that includes three components: a rapid qualitative assessment (RQA), a process evaluation, and an impact evaluation. The purpose of the evaluation is to learn if and how the programme impacts the lives of pregnant women and children under two years old for an array of outcomes including young child nutrition; health, water and sanitation practices; and the use of health related services. DFID Zambia contracted AIR and its partners (Palm Associates and UNC) to conduct the evaluation of the MCDP.

The primary goals of this baseline report are to describe the approach to identification, describe the sample of eligible households before they receive the programme, and check for equivalence between the treatment and comparison groups. This report first presents a brief background of the programme and the primary research questions that motivate the evaluation. Then we describe the study design and indicators for the evaluation, data collection, sample, compare the sample to national samples and the CGP cash transfer beneficiaries, and finally we present the equivalence between the treatment and comparison groups.

Background

In Zambia, half of all deaths among children under the age of five are attributed to maternal and child malnutrition. According to the most recent Demographic and Health Survey in Zambia (2013), 40 percent of Zambia's population under the age of five is stunted. This statistic amounts to one million children. Specific malnutrition figures include chronic malnutrition (45 percent), being underweight (15 percent), wasting (5 percent), and low birth weight (10 percent). Micronutrient deficiencies include vitamin A deficiency (54 percent) and iron deficiency anaemia (53 percent) (NFNC, 2012).

Malnutrition—including iodine deficiency and inadequate vitamin intake—leads to impaired cognitive development because the development of the brain is vulnerable to inadequate nutrition (Bardham et al., 2013). Evidence from Kenya further shows that malnutrition can result in decreases in school enrolment (Miguel and Kremer, 2004) and subsequent losses in labour productivity (Baird et al., 2011). The economic benefits of a healthier population are large: over a 10-year period, Zambia could increase its economic productivity by $1.5 billion USD with just a one percentage point per year decrease in stunting, a one-third reduction in maternal anaemia, and elimination of iodine deficiency (NFNC, 2011). The consequences of malnutrition are particularly severe during children's first 1,000 days of life (Almond and Currie, 2010).

In response to this situation, the National Food and Nutrition Commission (NFNC)—in coordination with several donors, including DFID, Irish Aid, and Swedish International Development Cooperation, and in accordance with recommendations put forward in the 2008 Lancet Series—developed a bundled, multisector programme called the MCDP in order to address Zambia's child malnutrition. Care International, in conjunction with the NFNC, coordinates the implementation and delivery of the programme through several ministries, including the Ministry of Health; the Ministry of Community Development, Mother and Child Health (MCDMCH); the Ministry of Education; the Ministry of Agriculture; NFNC; and the Ministry of Chiefs and Traditional Leaders. The multisector approach draws on the leadership of the NFNC and the promises made by Zambia when it signed the Scaling Up

Nutrition initiative. The three-year programme began at the end of 2014 and runs to the end of 2016, and will be implemented in 14 districts across Zambia.

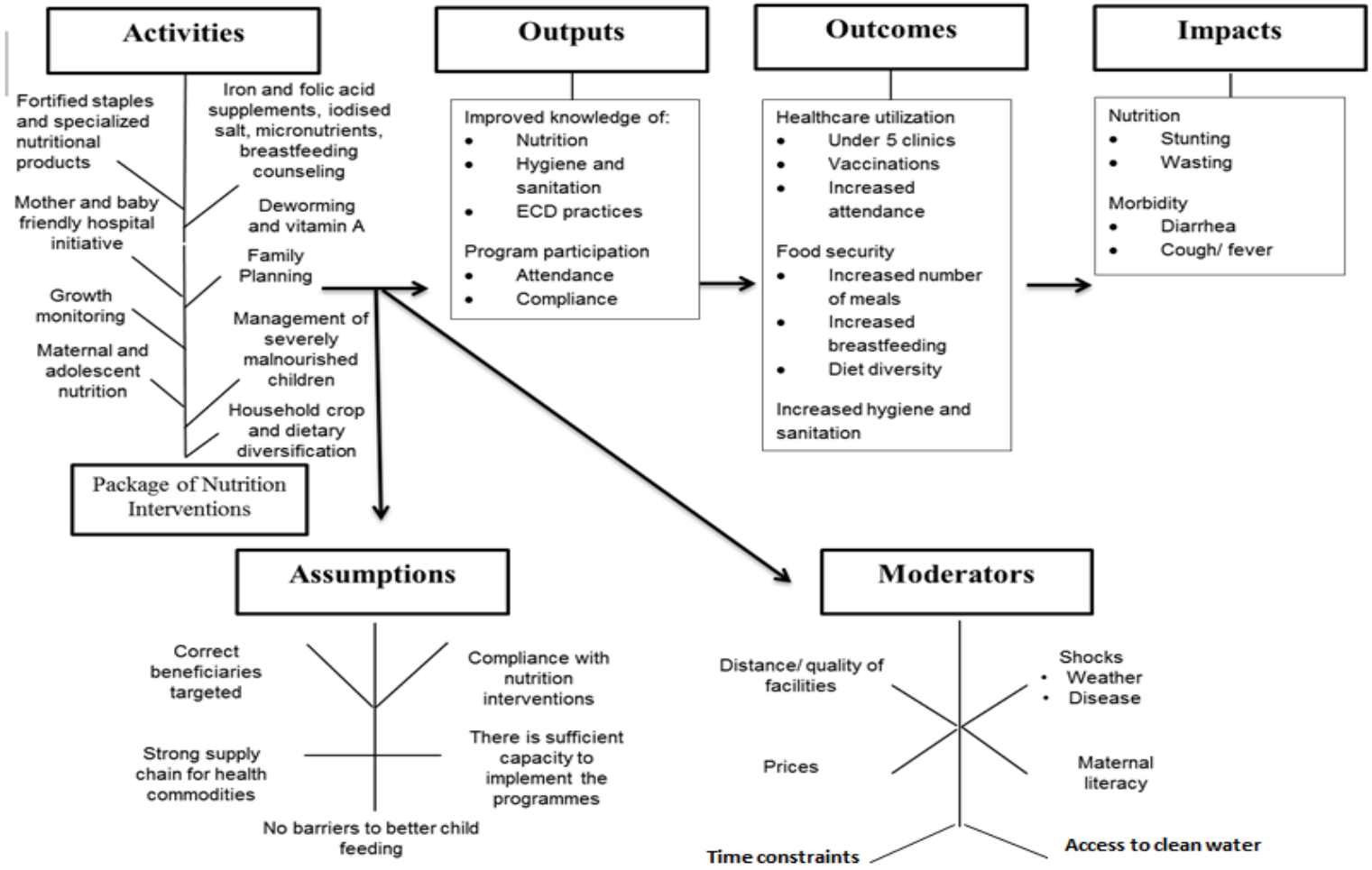
The programme targets households with pregnant women, or children under 24 months and includes a package of activities that focus on the following areas: iron and folic acid supplementation; micronutrient supplementation; promotion of best practices in breastfeeding and complementary feeding; promotion of diverse diets for pregnant and lactating women; zinc treatment for diarrhoea; promotion of safe water, hygiene, and sanitation; growth monitoring; vitamin A supplementation; deworming; management of acute malnutrition; and promotion of increased availability of diverse, locally available and processed foods, with a focus on women's empowerment and nutrition-sensitive messages in cash transfer and other programmes (National Food and Nutrition Commission of Zambia, 2012).

The individual interventions implemented by the MCDP have all been the subject of careful evaluation work in various settings, all of which has contributed to a strong evidence base for their effectiveness in improving nutrition outcomes. However, the evidence base for bundled interventions is much more limited, and the implementation and coordination challenges are considerable. A robust, mixed-methods evaluation, focusing on both impact and process, is therefore especially important in this context.

2. Theory of Change

The ultimate goal of the MCDP is to improve nutrition and reduce morbidity among children during their first 1,000 days of life. The theory of change (Figure 2.1 below) illustrates the bundle of interventions ("activities") comprising the MCDP and their intended outputs, which include improved knowledge and full participation in the programme. The anticipated outcomes—health care utilization and food security—will ideally lead to the end goal of improved nutrition and reduced child morbidity. The theory of change assumes effective targeting and implementation of the MCDP, and the absence of other barriers to child feeding. Our evaluation will test these assumptions and also explore the possibility of additional assumptions which the theory of change may have inadvertently omitted. We will investigate the possibility of moderating factors that might affect the impact of the programme. For example, sociological and health theories of nutrition caution that the impact of interventions may be affected by local conditions, access to services and facilities, mother's education, the cost of food, and weather. Further, evidence from the RQA indicates that time constraints (particularly for mothers) may also influence nutrition and feeding behaviours. Meanwhile, AIR's evaluation of the CGP in Zambia suggests that access to clean water may be another moderating factor. Our evaluation investigates heterogeneous programme effects by examining these factors and testing for moderation and mediation through established statistical techniques.

Figure 2.1 MCDP Theory of Change



The overarching research questions that are relevant to the baseline report follow:

1. Poverty and malnutrition
    a. What is the nature and experience of poverty and malnutrition, including access to food, dietary and feeding practices, and behaviour for households with young children in rural Zambia?
2. Programme Impact
    a. What is the combined effect of the package of interventions on nutrition outcomes for children?
    b. What is the combined effect of the package of interventions on food security?
    c. What is the combined effect of the package of interventions on child health?
    d. Do moderating factors such as mother's education or access to health facilities affect the impact of the programme on subgroups of the target population?

3. Study Design

The evaluation of the MCDP uses a two-year, mixed-methods, longitudinal, non-experimental design that includes four components: RQA, several stand-alone qualitative studies, a process evaluation, and an impact evaluation. This report focuses on the analysis of the household-level baseline data. These data will help programme staff understand the nutrition and health status of beneficiaries before the programme begins. This information will enable programme staff to know if they are targeting the right people. Furthermore, the results from the baseline study will help inform the design of the stand-alone qualitative studies that will occur one year into programme implementation.

Impact Evaluation: For the impact evaluation we will compare households with children under two years old from the two treatment districts of Chipata and Mbala that are eligible for the MCDP to households in the two comparison districts of Katete and Nakonde that do not receive the programme during the period of study but that are eligible for the programme. The comparison districts were selected by the NFNC, CARE, and the research team to be similar to the treatment districts by agro-ecological characteristics, culture, level of child morbidity and malnutrition, and level of development.

A major factor in the choice of a non-experimental design is that every household in the treatment districts will receive some of the interventions immediately and that all health workers within a district will be trained on the intervention at the same time. Thus, it was impossible to select a comparison group from within the same district as the treatment group because control households will also benefit from the programme, contaminating the study. The evaluation team will collect data on an array of indicators that relate to outcomes of interest in order to control for potential confounding factors. We will also use a difference-in-differences estimating framework to control for observed differences and time-invariant unobserved differences between treatment and comparison groups at baseline. The NFNC and DfID are aware that the current design leaves open the possibility that observed differences between the treatment and comparison households could result from an effect other than the interventions being studied. However, the current design with control variables and difference-in-differences modelling, plus the careful selection of a comparison group should mitigate this concern.

Mixed Methods: We will complement the findings of the impact evaluation with the results of the RQA, process evaluation, and stand-alone qualitative studies. The RQA facilitated formative research and was designed to provide tailored, programme-relevant information to MCDP implementers in order to guide

refinements to the programme (Roopnaraine & Reeves, 2014). The RQA used focused ethnographic studies, focus group discussions, and social mapping to determine the nature and experience of poverty and nutrition including access to food, dietary and feeding practices, and behaviour for households with young children in the two treatment districts; Chipata and Mbala. The stand-alone qualitative studies will focus on research to deepen our understanding of household experiences with poverty, malnutrition, dietary and feeding practices, and behaviour. The process evaluation will determine the fidelity of the MCDP.

Outcomes and Measures of Interest

Indicators for the evaluation were selected to address the research questions and align with the theory of change underlying the MCDP. We will measure indicators at each step of the causal chain to provide formative and summative evaluation data that can be used to explain what works and what needs modified to ultimately improve the programme design.

Consistent with international best practice in programme evaluation, the baseline instruments collected sufficient information along the causal chain of the theory of change to allow us to understand how the programme influences behaviour. By looking at the entire causal chain, we are better able to understand whether and how the programme influences behaviour, even when final outcome or impact indicators are not influenced by the programme. Changes in knowledge and behaviour are key mediators for subsequent health and nutrition impacts (see Figure 2.1, MCDP Theory of Change).

Knowledge of Primary Caregivers: We measure outputs that relate to the knowledge of primary caregivers about practices that are appropriate to improve children's nutrition outcomes. These indicators are associated with knowledge about appropriate breastfeeding practices, and appropriate complementary feeding practices. The MCDP emphasizes the importance of stimulating the knowledge of mothers and other household members about these practices. Furthermore, the DfID business case for the MCDP indicates that the knowledge available to mothers to care for their children is known to be a significant factor in preventing malnutrition. As indicated in the theory of change, knowledge about these practices is a necessary prerequisite for increasing their adoption. We used survey questions that were validated in Malawi to measure knowledge about appropriate practices to improve children's nutrition outcomes (Flax et al., 2012). The World Health Organisation (WHO) recommends exclusive breastfeeding up to six months of age with continued breastfeeding along with appropriate complementary foods up to two years of age or beyond (WHO, n.d.). In addition, the DfID business case for the 1000 days programme suggests that optimal infant and young child feeding entails age-appropriate diverse feeding of solid, semi-solid and soft foods from 6 months of age.

Behaviour of Primary Caregivers: We also measure the behaviour of primary caregivers that is associated with children's nutrition outcomes. The MCDP emphasizes the importance of changes in breastfeeding and complementary feeding practices as well as health-seeking behaviour to improve children's nutrition outcomes. The theory of change indicates that the practices of primary caregivers that stimulate children's nutrition outcomes can improve following improvements in knowledge about practices to improve children's nutrition outcomes. We selected indicators from the Zambian DHS to measure the adoption of vaccinations, and infant and young child feeding practices. For the measurement of complementary feeding practices we used survey questions that were validated in Malawi (Flax et al., 2012).

Child Health: The MCDP is expected to improve child health outcomes, such as diarrhoea and fever incidence following the adoption of appropriate infant and young child feeding and complementary feeding practices. Therefore, we included several self-reported indicators of child health with an emphasis on diarrhoea and fever incidence and treatment, and upper respiratory illness. Each year diarrhoea kills around 7,560,000 children under five years old around the world, so it will be crucial for the programme to reduce the burden of diarrhoea incidence in the Zambian context. Furthermore, fever is oftentimes an indication of malaria in the context of rural Zambia which is also known to cause death in children under five. Finally, the programme could reduce the incidence of upper respiratory illness by improving the immune system of children through the improvement of nutrition outcomes. For the measurement of diarrhoea and fever incidence and upper respiratory illness we used indicators from the Zambian DHS.

Anthropometric Outcomes: We also report children's nutrition outcomes to estimate the incidence of stunting, wasting, and being underweight during the baseline survey. The MCDP is expected to improve children's nutrition outcomes following the improvement in practices related to these measures. During the survey we took anthropometric measures such as the height and weight of children under two years old. Then we used the WHO child growth standards to calculated weight-for-height, height-for-age, and weight-for-age, the same calculations used by the Zambian Central Statistics Office for the DHS. Wasting refers to abnormal departures from weight-for-height or a weight-for-height z-score that is -2 to -3 standard deviations from the reference median value. Stunting refers to abnormal departures from height-for-age or a height-for-age z-score that is -2 to -3 standard deviations from the reference median value. Underweight refers to abnormal departures from weight-for-age or a weight-for-age z-score that is -2 to -3 standard deviations from the reference median value.

Moderators: A moderator is something that could affect the ability of the programme to have an effect, either making it stronger or weaker, depending on the moderator. Both the impact evaluation of the CGP and the RQA suggest there are several potential moderators that could influence the impact of the MCDP. First, the evaluation of the social cash transfer programme shows that cash transfers are only effective in improving nutrition outcomes when households have access to clean water (Seidenfeld et al., 2014). Second, the RQA shows that primary caregivers face additional constraints that could impede the effectiveness of the MCDP. Most importantly, mothers often do not have the time and money to adopt appropriate feeding practices even when they have the knowledge. Furthermore, primary caregivers sometimes do not have the decision-making power to adopt appropriate feeding practices. Therefore, we believe it is crucial to also measure the possibility of moderating effects, such as water and sanitation practices. We used indicators from the Zambian DHS to measure these moderators. In addition, we will interpret the findings of the impact evaluation, while taking into consideration the constraints that mothers face in adopting appropriate feeding practices.

Background Characteristics: In addition to the indicators for the evaluation, we also collected data on background characteristics that are associated with the performance of the programme and/or nutrition outcomes, such as assets, education, and other household characteristics. The analysis of these data will serve to determine whether there is balance in observable characteristics across the treatment and the comparison group and enable us to statistically control for these differences if they exist.

Coverage

The study will compare eligible households with children under two years old from the treatment districts of Chipata and Mbala to eligible households in the two comparison districts of Katete and

Nakonde. The latter households do not receive the programme during the period of study. The comparison districts are selected to be similar to the treatment districts by agro-ecological characteristics, culture, level of child morbidity and malnutrition, and level of development. Each of these characteristics is similar in both Chipata and Katete and Mbala and Nakonde (the districts in each pair border their similarly chosen district, making them geographically similar). For example, both Chipata and Katete experience erratic rainfall, which results in significant shocks to agricultural productivity in both districts. These shocks could have adverse consequences for food consumption and production, which may subsequently result in worsening nutrition outcomes. Furthermore, both Mbala and Nakonde are among the most remote districts in Zambia with little access to roads and other infrastructure. Taking these characteristics into consideration, we believe that the districts are comparable to each other and Katete and Nakonde can serve as an appropriate counterfactual for Chipata and Katete, respectively.

Sampling Process

The longitudinal impact evaluation includes 1,200 households with children under two years old in twelve wards across four districts with half in the treatment sample of Chipata and Mbala and half in the comparison sample of Katete and Nakonde. This study will calculate the average impact of the programme using a difference-in-differences model that accounts for clustering of households in Standard Enumeration Areas (SEA). Due to the limited number of wards in each district, this study is unable to estimate impacts at the district level with reasonable precision (95% confidence interval) and can only estimate the impacts of the programme overall. There are more beneficiary households and wards in the selected districts than needed for the sample, thus we identified and selected a sub-set of households and wards for the study. The steps for selecting the sample were as follows:

1. Two treatment districts were selected by the NFNC and DfID; Chipata and Mbala
2. Two comparison districts were selected by the NFNC, CARE, and the research team based on agro-ecological characteristics, culture, level of child morbidity and malnutrition, and level of development; Katete and Nakonde
3. The research team, in coordination with CARE and the NFNC, generated a list of all the wards in each selected district (only including wards where the programme will be implemented in treatment districts).
4. The research team, CARE, and the NFNC reviewed the list of wards and eliminated all completely urban wards from the list.
5. CARE, NFNC and the evaluation team randomly selected three wards in each district to be included in the study.
6. The research team identified the selected wards using maps with SEA from the Central Statistical Office (CSO) in Zambia. Each district in Zambia is subdivided into Census Supervisory Areas and these are in turn demarcated into SEA.
7. The research team generated a list of all eligible households in each selected ward. For the listing process the data collection team identified all households with children under two years old after a proper introduction with local community leaders. The enumerators met with each household, verified that the household has a child under two years old, and collected basic information such as the names of the household members, and the age of all children under two years old verified with birth certificates.
8. The research team of AIR and Palm then randomly selected 100 households in each ward from the eligible list to participate in the study, using the lists generated in step 7 by the research team and a table of random numbers generated in Stata.

Our power calculations suggest that our proposed sample size of 1,000 households will be sufficient to detect small but meaningful effects on crucial nutrition indicators, such as stunting and wasting. On the basis of our sample of 1,000 households across 50 clusters (SEA), we would have an 80 percent power to detect a treatment effect of 0.17 standardized mean differences on the likelihood of stunting based on a difference-in-differences model with an intra-class correlation of 0.02580, a mean value of stunting of 0.30, and a standard deviation for stunting of 0.46. We would also have 80 percent power to detect a treatment effect of 0.185 standardized mean differences on the likelihood of wasting based on a difference-in-differences model with an intra-class correlation of 0.04616, a mean baseline value of wasting of 0.09, and a standard deviation for wasting of 0.29.

The research team was able to exceed the originally proposed sample size of 1,000 households by deliberately oversampling the households by 20 percent. Palm Associates managed to interview 100 households per ward. As a result the total sample size was increased to 1,200 households rather than 1,000 households. This larger sample will increase the statistical power of our evaluation to detect small but meaningful effects.

Our power calculations are grounded in empirical data from the rural context of Zambia. We calculated intra-class correlations for anthropometric outcomes, such as stunting and wasting. We also estimated the intra-class correlations for households' outcomes clustered within SEA by using the baseline data from the evaluation of the 1000 days programme. The intra-class correlation for stunting and wasting are 0.02580 and 0.04616, respectively. For our power calculations we further assume a 95 percent confidence interval.

We have already taken into consideration the option of attrition by assuming a sample size of 1,000 households, as originally envisioned, rather than 1,200 households, after oversampling in the communities. Second, our power calculations do not yet take into consideration a positive R squared. Our power to detect effects with sufficient precision will increase if we minimize attrition and include explanatory variables that predict nutrition outcomes in our regression model.

4. Overview of Data Collection

To ensure high-quality and valid data, AIR and Palm Associates emphasized the importance of the process and timing of data collection, making sure that the data collection was culturally appropriate, sensitive to Zambia's agricultural cycle, and consistently implemented. A team of Zambian enumerators experienced in household surveys and fluent in the local language where they worked were trained on the instrument and then assisted with piloting testing in the field in Lusaka before moving into their assigned communities for data collection.

The timing of the data collection falls right before the rainy season meaning that enumerators can travel to the more remote areas without major problems. It also means that households are in a more vulnerable and food insecure state as compared to the harvest season in May and June. The rainy season represents the most vulnerable time of year for children, so it is important to see if the programme can have an impact during this time period. The baseline data collection occurred from 2 November to 16 November 2014. The two year follow-up will occur at the same time of year to control for seasonality effects.

The baseline survey data collection plans coincided with the death of the president of Zambia. Our discussions with the data collection team made it clear that the data collection would not experience major difficulties as a result of the death of the president. Therefore, baseline data collection occurred according to plan.

The field work was carried out by four supervisors, 16 enumerators, and 8 drivers, all led by the Palm Associates team leader and supported by the international researchers from AIR. Each of the four survey teams comprised one supervisor, four enumerators, and two drivers. In addition, the NFNC, head teachers, village heads, and other key community leaders supported and monitored the teams and helped identify villages and households and the borders of SEA.

One enumerator collected data in each household, interviewing the identified recipient and documenting her answers. In addition to interviewing the primary caregiver of the children 0-2 years old, the enumerator collected anthropometric measures (height and weight) for every child age 2 or under, using high-quality height boards and scales endorsed by the NFNC. Enumerators were trained in proper anthropometric measuring techniques and then supervised in the field by their supervisors, who can be considered specialists in the measurement of anthropometric outcomes.

The team successfully collected all expected data between the 1st and the 16th of November. The goal was to collect 1,000 household surveys. As discussed above, the team deliberately oversampled households and collected 1,200 household surveys. None of the selected households refused to participate in the survey so no replacement households were needed. The communities' willingness to participate might be a result of the limited length of the survey. The final instrument takes approximately 45 minutes to complete, which avoids interviewer and respondent fatigue.

Lessons learned and limitations for future data collection: We did not face many challenges to data collection this round and do not expect many challenges during the follow-up rounds. This study does not track the same children over time, instead we collect data from households with children under 2 in the same area, thus we do not need to worry about attrition or losing households from the study. We will conduct the same listing exercise at follow up to identify households with children under two. The greatest challenge to data collection and the study is accurately identifying the age of the children. Age is an important measure for accurately assessing stunting and wasting, measures that are sensitive to measurement error including inaccurate age. We use birth registration cards to assess a child's age, but this method carries two problems: first there are children who do not have a birth card and then we either have to ask the parents who may not provide the most accurate information or we do not use the child in the study which could lead to bias in the generalizeability of the study since children without birth cards tend to live the furthest from the clinic or be the most poor. Second, some parents acquire a birth card for their child well after the child is born (sometimes months or years later) and so the birth date on the card may not be accurate. Unfortunately, there is no solution to these problems that occur in most studies of young child nutrition. It is important to be consistent between treatment and comparison groups and between baseline and follow up so that we do not introduce bias that threatens the internal validity of the study.

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.

5. The Sample

The primary purpose of the baseline data collection is to measure the starting point for everyone in the sample and check that the treatment and comparison conditions are balanced before the start of the intervention. This section describes the sample for the study by presenting household, maternal, and

child characteristics of beneficiary households. Basic household characteristics, such as household size or individual-level characteristics like mother's age or education, are important as they could influence child nutrition but will not be affected by the programme. Other household factors, such as access to clean water and proper sanitation, may also affect child nutrition outcomes. Thus, we present the baseline values for these moderating factors. In addition to these characteristics, we also present indicators related to child nutrition that the programme intends to change such as maternal knowledge and behaviour on child health, and child nutrition outcomes. While the goal of the programme is to improve child nutrition outcomes, various indicators such as knowledge and behaviour related to nutrition are important steps along the causal chain, thus we present them here.

The sample contains 1,200 households, 600 of which are in the treatment districts of Chipata and Mbala and 600 in the comparison districts of Katete and Nakonde. Here we present only data from the treatment districts. We present the balance between the treatment and comparison groups on these indicators in a later section.

Household, Mother, and Child Characteristics

Household characteristics present the basic context in which the programme will operate. Households contain an average of six people, with half of the households containing between four and seven people. Because eligibility criteria for MCDP require that mothers are pregnant or have children under two, these households are younger and therefore potentially smaller than the average rural Zambian household. Figure 5.1 shows the distribution of household size in the sample. There are 600 children under two years old in the sample, 49 percent of which are boys and 51 percent are girls. The children under two in the sample are fairly evenly spread by age, with the highest proportion of babies being under 6 months old and a slight decline in numbers as we look at older age groups. This pattern is to be expected given that these are vulnerable populations with relatively high infant mortality rates. Table 5.1 shows the distribution of children by age under 24 months old.

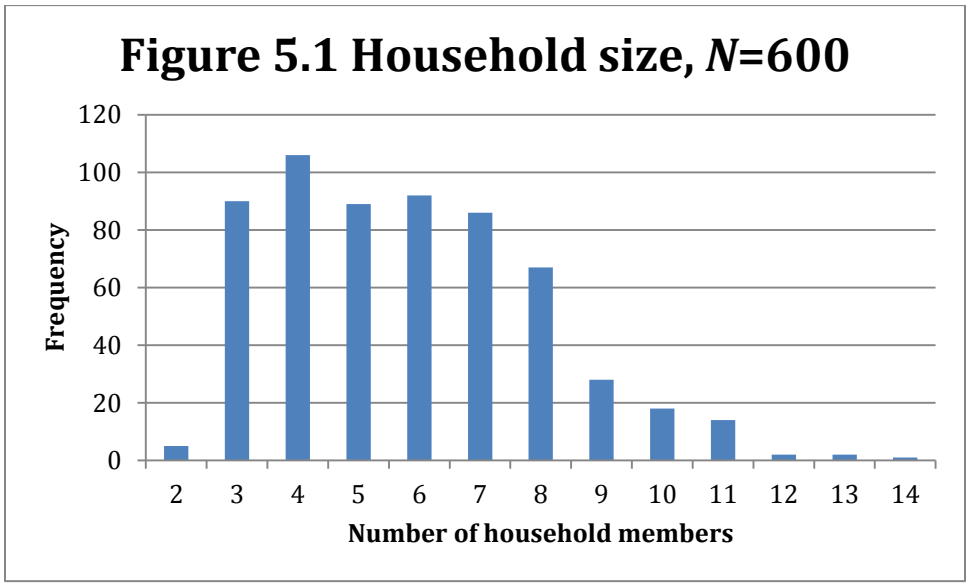


Table 5.1 Children Under Two

Age	Percent
0-6 months	0.31

7-12 months	0.27
13-18 months	0.19
19-23 months	0.23
N	599

Food security is an important household characteristic that is relevant to child nutrition. Households were assessed on their level of food security, using the Food and Nutrition Technical Assistance Project food security score. The score has a potential range of 0-27, with a higher value indicating more food insecurity. Scores are based on the frequency to which households lack access to food, in both quantity and type (Coates, J., Swindale, A., & Bilinsky, P., 2007). Households are also categorized by two binary measures of food security. Moderate or severe food insecurity classifies households by the frequency with which members of the household eat smaller meals, lack food, or eat limited food because of lack of resources.

Beneficiary households in the sample generally show a low degree of food security. Over 40 percent of households are classified as moderately food insecure, and 34 percent of households are classified as severely food insecure. These levels of food insecurity in the two sample districts show that MCDP targeting is appropriate. MCDP will be working in areas with a demonstrated need for nutrition interventions.

The poverty level of the household is also a relevant indicator for MCDP and something that contributes to child nutrition levels. We estimated the poverty level of each household using the same proxy means test that the Zambian government uses to identify eligible households for their social cash transfer programme. The term "proxy means test" refers to a methodology used to produce a measurement of welfare for a given household, using a few basic characteristics of the household. The MCDMCH uses a proxy means test to target eligible households for the social cash transfer being implemented nationwide. The living conditions index is calculated using ten household characteristics, each of which is associated to a specific contribution score that is summed up to give a total household score. The higher the total score, the higher the likelihood that the household is well-off; conversely, the lower the score, the more likely the household is impoverished. A cut-off score was developed for the cash transfer programme to signify which households are considered poor or non-poor.

The ten variables used for the proxy means test are:

- Highest education level achieved by household members 15 and above[1]
- Type of toilet used
- Type of roof in the house
- Source of lighting
- Most used cooking fuel
- Ownership of mattress
- Ownership of sofa
- Ownership of television
- Ownership of clock
- Ownership of electric iron

[1] This indicator is reported as the highest grade level completed for each person over 14 years old.

For every household and every question there is only one possible outcome and the total score is calculated summing up all the corresponding contribution scores. The total score is then rescaled to produce a final score of between 0 and 1000. This calculation is done as follows: Final score = (household score + 1854)/6.904. The cut-off for rural households is 462. The scores used by the MCDMCH have been validated nationally to calculate eligibility for the cash transfer programme, therefore the same scores and cut-offs have been used on the 1000 days study sample. For clarity we provide three examples in Appendix A.

Nearly all beneficiary households in the sample (98 percent) are classified as very poor because they fall under the poverty threshold. It is not surprising that the households are almost all living under the national poverty threshold since the MCDP targeted the districts with the most dire child nutrition outcomes.

Access to water and sanitary living conditions are vital for child health and nutrition. MCDP does not impact these conditions, but because these conditions affect nutrition, their baseline values are relevant. Households have high levels (68 percent) of soap usage, and safe disposal of faeces (97 percent), though both indicators might be upwardly biased because of self-reporting. One in three households has access to clean drinking water from a protected water source. The low number of households with access to clean drinking water could limit the impact of the MCDP on child nutrition outcomes since this is a similar finding in the CGP impact evaluation. Most alarming is that almost no households (6 percent) have latrines. Table 5.2 provides the household level indicators described above.

Table 5.2 Household Summary Table

Variables	Mean
Household size (people)	5.82
Food security scale	6.33
Severe food insecurity (%)	0.34
Moderate food insecurity (%)	0.41
Under poverty threshold (%)	0.98
Members use soap when washing hands (%)	0.68
Safe disposal of child faeces (%)	0.97
Drinking from protected water source (%)	0.33
Using improved/hygienic latrine (%)	0.06
N	600

According to the theory of change, the characteristics of mothers can affect child nutrition and also affect the programme's ability to impact child nutrition. For example, the CGP has a bigger effect on child nutrition when the child's mother is more educated. The mothers in beneficiary households in our sample have low levels of education, high rates of marriage, and are in their late 20s on average. Mothers have an average of just over four years of education, meaning most did not complete primary school. We will investigate whether the impact of the program varies by mother's education during the follow up study. Mothers in the sample are as young as 16 and as old as 63, with a mean age of 27. Over 80 percent of mothers are currently married; while eight percent have never been married and one percent are widowed. Table 5.3 presents a description of mothers in the sample.

Table 5.3 Maternal Summary Table

Variables	Mean

Age (years)	27.45
Education (years)	4.29
Married (%)	0.84
Never married (%)	0.08
Widowed (%)	0.01
Divorced (%)	0.03
N	600

We now turn to outcomes of interest for the study related to child nutrition. We present baseline levels for indicators in four categories: knowledge, practice, child health, and child nutrition.

Infant and Young Child Feeding Knowledge

Respondent knowledge of infant and young child feeding ranges from strong in many areas, such as early feeding practices around breastfeeding, to quite low in other areas, such as diet diversity and feeding in the context of HIV. One element of MCDP's bundled approach is to improve infant and young child feeding. Understanding the current knowledge and practices of women in the targeted districts is essential to tailoring the programme appropriately. Mothers were asked how soon a newborn child should be put to the breast after birth: 76 percent reported within one hour, which is the recommended best practice. Mothers were also asked for how long a child should be exclusively breastfed, and 91 percent reported at least six months. However, when asked to define exclusive breastfeeding, 3 percent of respondents could correctly answer, so this seems to be an area where the programme could focus education. Mothers were asked about the appropriate time to begin complementary feeding, or the introduction of solid, semi-solid, or soft foods, and 75 percent of respondents could answer correctly. Also, 60 percent of mothers were able to correctly state the minimum number of meals in a day for babies under one year old. Knowledge of feeding practices for newborn babies is strong, but knowledge of feeding practices for older babies seems to slightly decrease. Table 5.4 presents data on infant and young child feeding (IYCF) knowledge indicators, including feeding in the context of illness or HIV.

Feeding in the context of illness or HIV is also an important element of IYCF knowledge. Mothers' levels of knowledge lagged compared to general IYCF knowledge questions. One third of the mothers know that children need to be given extra nutrition after a period of illness. About one in five respondents were aware that HIV can be transmitted through breast milk. Nearly half of respondents were aware of at least one way HIV transmission through breast milk can be reduced. Almost no respondents were aware that an HIV-positive mother is recommended to wean her child at 12 months.

Table 5.4 Infant and Young Child Feeding Knowledge

Variables	Percent
Early initiation of breastfeeding	0.76
Exclusive breastfeeding under 6 months	0.91
Exclusive breastfeeding definition	0.03
Complementary feeding	0.75
Minimum feeding	0.60
Minimum diet diversity	0.24
Feeding after illness*	0.35
HIV transmission through breast milk	0.21
HIV prevention through breast milk	0.46

HIV weaning knowledge	0.02
N	600

*Asked only if children had been ill (n=544)

Infant and Young Child Feeding Practices

While the knowledge around IYCF was reasonably high, the practices of mothers were often much lower. Although 76 percent of mothers are aware of the importance of early initiation of breastfeeding, only 67 percent of them actually breastfed their babies within an hour of birth. Similarly, 91 percent demonstrate knowledge of exclusive breastfeeding, but 76 percent of mothers in practice exclusively breastfeed their children in the first six months. Almost all mothers (90 percent) continue to breastfeed their children into the second year.

Practices around complementary feeding was one of the few areas where the practices of what mothers are actually doing are better than the knowledge they have on the subject as 75 percent of mothers had the correct knowledge but 90 percent of mothers introduce complementary foods at the right age. Mother's practices of diet diversity for their children are also higher than their knowledge on the topic, but levels of both are low (24 percent have adequate knowledge; 37 percent have correct practices). Practices of feeding frequency, at 43 percent, are lower than knowledge, at 60 percent. There appears to be room for the programme to improve knowledge and practice of feeding frequency and diet diversity, but we do not expect much change in the areas of breastfeeding in the second year or complementary foods since the levels are already so high.

Finally, we collected data on two other important IYCF practices, both of which have low results. Only 15 percent of children in the sample have a minimum acceptable diet.[2] While only 38 percent of children receive an iron-rich food or iron-fortified food that is specially designed for infants and young children, or that is fortified in the home. Part of the MCDP package includes iron supplementation. Baseline data suggest there is a need for such supplementation and room for the programme to have an impact. Table 5.5 presents the IYCF practices for the sample.

Table 5.5 Infant and Young Child Feeding Practices

Variables	*N*	Percent
Early initiation of breastfeeding	600	0.67
Exclusive breastfeeding, under 6 months	163	0.76
Continued breastfeeding, 12-15 months	103	0.90
Complementary feeding	71	0.93
Minimum diet diversity	430	0.37
Minimum feeding	435	0.43
Minimum acceptable diet	600	0.15
Consumption of iron rich or fortified foods, 6-23 months	437	0.38

[2] The proportion of children 6–23 months of age who receive a minimum acceptable diet (apart from breast milk). These include two groups: 1.) Breastfed children 6–23 months of age who had at least the minimum dietary diversity and the minimum meal frequency during the previous day; 2.) Non-breastfed children 6– 23 months of age who received at least 2 milk feedings and had at least the minimum dietary diversity not including milk feeds and the minimum meal frequency during the previous day.

Child Health

Child health, as measured by incidence of diarrhoea, fever and acute respiratory illness (ARI), as well as use of care, are important factors connected to MCDP. In the two weeks before the survey, 27 percent of children in the sample had diarrhoea, 29 percent had a fever, and 16 percent had ARI (cough accompanied by rapid breathing). Of those with illness, a high percentage sought treatment: 73 percent for diarrhoea, 81 percent for fever, and 81 percent for ARI. Thus, there is less room for big impacts on seeking care because it is already happening. Though access to health care is high with 94 percent of the sample going to a well-baby clinic in the last six months, vaccination rates are lower than expected, with less than half (47 percent) of children in the sample (all under two years old) having been fully vaccinated. Table 5.6 presents the child health outcomes for the sample at baseline.

Table 5.6 Child Health, 0-23 months

Variables	*N*	Percent
Morbidity		
Diarrhoea last two weeks	599	0.27
Fever last two weeks	597	0.29
ARI last two weeks	600	0.16
Preventive care & treatment		
Child is fully vaccinated	600	0.47
Child taken to well-baby or under 5 clinic in last 6 months	600	0.94
Sought treatment for diarrhoea	161	0.73
Sought treatment for diarrhoea using ORS	152	0.81
Sought treatment for fever	175	0.77
Sought treatment for ARI	97	0.81

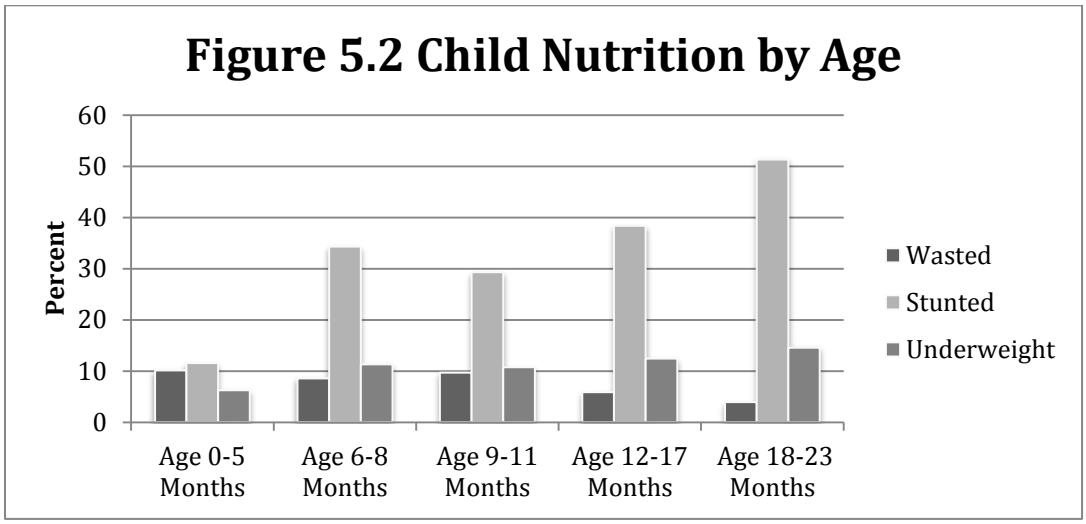
Child Nutrition

Stunting is considered the best indicator of chronic malnutrition. As expected, the incidence of stunting is very high in these targeted regions, at 34 percent. Wasting is much lower, at seven percent. 11 percent of children under age two are underweight. All indicators were constructed according to the WHO definitions of being below two standard deviations away from the median using the 2011 WHO growth standards. Table 5.7 shows the three major child nutrition indicators.

Table 5.7 Child Nutrition, 0-23 months

Variables	Percent
Wasted	0.07
Stunted	0.34
Underweight	0.11
N	600

While the incidence of child malnutrition is high, it does vary throughout the first two years of the child's life. Rates of wasting, stunting and being underweight vary slightly throughout the first two years. Rates of wasting decrease slightly as children age; stunting starts low but jumps as children age; rates of underweight also slightly increase (see Figure 5.2 below). Stunting, the best measure of chronic malnutrition is highest of the three indicators. The changing levels of child malnutrition indicators could relate to the growth patterns of children in the first two years, but are worth noting for specific MCDP intervention targeting that is time-sensitive.



6. Comparing the MCDP Sample with the CGP and National Samples

In this section we compare some key features of the MCDP sample population to those of samples taken from the CGP 2013 data and the nationally representative 2013-14 Zambian DHS. This comparison is facilitated by the fact that during the design of the survey instruments for both the CGP and MCDP, questions were purposely selected exactly as they appear in the DHS survey instruments. These items not only measure a number of child health outcomes related to the MCDP main outcomes, but they have been validated and psychometrically tested by the DHS, a nationally representative household survey.

The Zambia CGP is one of several social protection cash transfer programmes currently being implemented in Zambia. Starting in 2010, the MCDMCH, began implementing the CGP, which targets households with children under the age of five in three remote districts of Zambia (Shangombo, Kalabo and Kaputa). The MCDMCH selected these districts, in part, due to the high rates of mortality, morbidity, stunting, and wasting among children under five. The MCDP targets households with pregnant women or children under 24 months, also representing a unique subpopulation of young families. Both CGP and MCDP have large samples of young children, are located in rural districts in Zambia, and are implementing programmes that are motivated by improving child health and nutrition outcomes.

The data used from CGP were collected in November/October 2013, approximately three years into programme implementation. Half of the CGP sample has been receiving the cash transfer (treatment), while the other half do not, serving as a control group for the analysis. Therefore, we are able to compare the MCDP population to similar rural households with small children from two groups: one that has had the benefit of receiving a government run cash transfer bimonthly for three years, and another who has not been enrolled in any such programme. We will also compare the groups again during the

MCDP follow up analysis. We compare a set of demographic, food security, and poverty indicators using the CGP data for households with at least one child under the age of two, broken into treatment and control subsamples. Both MCDP and CGP populations are rural and poor, with low maternal education levels. The link between the household and children can be moderated by household-level characteristics themselves, such as the mother's education or household size.

Demographic Characteristics Comparison

Demographic characteristics of households from the evaluation sample have been compared to the CGP from the 2013 follow-up data collection (three years into the programme) to see how these populations differ. The CGP sample is broken up into treatment and control and restricted to only households that have at least one child under the age of two to make the groups more comparable. Overall household size is smaller for MCDP as compared to the CGP sample, which could be expected considering that in order to qualify, households had to have a child under the age of five and may have had more children since. The CGP sample has more children ages six through 12 and more older members. However, the share of children under age two in the household is the same between MCDP and CGP (both treatment and control). The MCDP sample is also much less food insecure than the control CGP, and even less food insecure than the treatment households in the CGP sample, despite large improvements on food security attributable to the CGP.[3] Table 6.1 shows the demographic comparison between CGP and MCDP samples. The table shows that the MCDP sample has slightly fewer household members, fewer children under six to 12 years old, and fewer older family members, although they are almost as likely to be poor while not as likely to be food insecure.

Table 6.1 Comparison of Household Characteristics, CGP versus MCDP

	MCDP, 2014	CGP Control, 2013	CGP Treatment, 2013
	Mean	Mean	Mean
Number of residents in household	5.82	6.48	6.53
Demographic composition (%)			
Share 0-5 years	0.35	0.35	0.35
Share 6-12 years	0.17	0.22	0.23
Share 13-18 years	0.09	0.08	0.09
Share 19-35 years	0.32	0.25	0.24
Share 36-55 years	0.07	0.08	0.09
Share 56-69 years	0.00	0.01	0.01
Share 70+ years	0.00	0.01	0.00
Food security and poverty (%)			
Severely food insecure	0.34	0.72	0.41
Moderately food insecure	0.41	0.25	0.51
Poor*	0.97	0.99	0.98
N	600	751	729

*Poverty measured by proxy means test described in section 5.

[3] American Institutes for Research. (2015). Zambia's Child Grant Programme: 36-month impact report. Washington, DC: Author.

MCDP mothers are slightly younger than in the CGP (27 years old as compared to 31 years for both treatment and control CGP households, on average), but have approximately the same number of years of education (on average all groups have a mean highest level of education of grade 4). 84 percent of mothers in the MCDP sample are married, slightly higher than the CGP treatment (81 percent) and control (79 percent). This also may be related to the younger age of the MCDP mothers, as well as the fact that the CGP households also have a larger number of older children. Table 6.2 compares the MCDP maternal characteristics to the CGP population.

Table 6.2 Comparison of Maternal Characteristics, CGP versus MCDP

	MCDP, 2014 Mean	CGP Control, 2013 Mean	CGP Treatment, 2013 Mean
Maternal age (years)	27.45	30.75	31.36
Maternal education (years)	4.29	3.72	4.34
Maternal marriage status (%)	0.84	0.79	0.81
N	600	751	728

Child Nutrition and Health Comparison

Malnutrition is a serious concern in Zambia, where roughly half of all deaths among children under five are attributed to maternal and child malnutrition. Stunting is widespread in Zambia, with the most recent DHS (2013-14) preliminary report showing 40 percent of all children under the age of five as stunted, a moderate improvement to the 2007 DHS report of 45 percent of children stunted. Large numbers of Zambian children suffer from nutrition-related disorders such as low birth weight, wasting, being underweight, chronic malnutrition, and various nutrient deficiencies. Table 6.3 shows the rates of stunting, wasting, and underweight for the MCDP sample, as compared to the CGP and DHS when available.[4]

The MCDP has slightly less prevalence of both underweight and wasted children under the age of 2 than does the CGP, but the rates of stunting are comparable (34 percent versus 35 percent for CGP treatment and control). When comparing the subsamples by age groups, the MCDP malnutrition rates show similar trends to the CGP and DHS: stunting increases as children age. Table 6.3 shows these detailed comparisons between the MCDP, CGP, and DHS overall and by subgroup when available.

[4] 2013-14 ZDHS data were unavailable at the time of the analysis. Only aggregate statistics on all children under the age of 5 and select disaggregated statistics were available in the preliminary report.

Table 6.3 Comparison of Child Nutrition, CGP and DHS versus MCDP

	MCDP, 2014		CGP Control, 2013		CGP Treatment, 2013		DHS, 2013-14	
	N	Percent	*N*	Percent	*N*	Percent	*N*	Percent
Wasted								
0-5 months	119	0.10	42	0.17	46	0.07	1,032	0.08
6-8 months	70	0.09	55	0.13	54	0.07	585	0.09
9-11 months	83	0.10	71	0.04	91	0.09	606	0.10
12-17 months	120	0.06	150	0.08	148	0.11	1,300	0.08
18-23 months	153	0.04	122	0.11	120	0.05	1,206	0.06
0-23 months	545	0.07	440	0.10	459	0.08	4,729	0.08
Stunted								
0-5 months	121	0.12	38	0.11	41	0.15	1,032	0.14
6-8 months	70	0.34	56	0.20	54	0.13	585	0.25
9-11 months	82	0.29	68	0.31	92	0.26	606	0.39
12-17 months	120	0.38	152	0.42	145	0.40	1,300	0.43
18-23 months	154	0.51	123	0.43	119	0.55	1,206	0.54
0-23 months	547	0.34	437	0.35	451	0.35	4,729	0.37
Underweight								
0-5 months	160	0.06	107	0.19	115	0.13	1,032	0.06
6-8 months	71	0.11	56	0.13	53	0.11	585	0.11
9-11 months	84	0.11	72	0.10	93	0.12	606	0.17
12-17 months	121	0.12	159	0.15	150	0.17	1,300	0.14
18-23 months	158	0.15	125	0.17	122	0.18	1,206	0.18
0-23 months	594	0.11	519	0.15	533	0.15	4,729	0.13

MCDP children suffer from higher rates of diarrhoea, fever, and ARI than the CGP children, with approximately one in three reported having each of these illnesses. Child morbidity contributes to malnutrition, largely in part to lack of maternal knowledge on feeding children while ill and loss of nutrients to symptoms of illness. Unlike the CGP, the MCDP will promote proper sanitation practices, which can lower the risk of childhood diarrhoea, as well as help to reduce spread of other communicable diseases. Access to safe water is another factor in preventing illness, but the MCDP will not likely affect the ability for households to access safe water sources. Table 6.4 shows the high incidence of illness in the MCDP as compared to the CGP.

Table 6.4 Comparison of Child Morbidity 0-23 months, CGP versus MCDP

	MCDP, 2014	CGP Control, 2013	CGP Treatment, 2013
	Percent	Percent	Percent
Diarrhoea	0.27	0.05	0.08

Fever	0.29	0.08	0.11
ARI	0.34	0.04	0.02
N	600	528	557

Despite relatively high levels of illness, children in the MCDP sample utilize preventative care at higher levels when compared to both CGP and DHS. Immunization rates for MCDP children are ten percentage points higher than the national levels, and nearly all children (94 percent) in the sample have visited a well-baby or under five clinic during the six months prior to the survey, compared with 88 percent of both treatment and control CGP groups. However, comparisons on treatment for illness are mixed. Compared to the DHS, MCDP treatment for fever, diarrhoea, and ARI are higher than the national average across all age groups. CGP treatment rates are slightly higher for diarrhoea, fever, and ARI, but the reporting of these illnesses in the CGP are so low that they may not be a good comparison.

Table 6.5 Comparison of Child Preventative Care & Treatment, CGP and DHS versus MCDP

	MCDP, 2014		CGP Control, 2013		CGP Treatment, 2013		DHS, 2013-14	
	N	Percent	*N*	Percent	*N*	Percent	*N*	Percent
Fully vaccinated, age 12-23 months	250	0.78		N/A		N/A		0.68
Preventative care	600	0.94	528	0.88	557	0.88		N/A
Diarrhoea treatment								
0-5 months	12	0.67	3	0.67	5	0.80	75	0.57
6-11 months	68	0.74	8	0.75	17	0.76	344	0.67
12-23 months	81	0.73	14	0.79	23	0.87	711	0.71
0-23 months	161	0.73	70	0.76	45	0.82	1130	0.69
Fever treatment								
0-5 months	34	0.76	2	0.50	3	1.00	151	0.71
6-11 months	51	0.78	10	0.90	21	0.86	322	0.74
12-23 months	90	0.77	30	0.80	39	0.74	699	0.73
0-23 months	175	0.77	42	0.81	63	0.79	1172	0.73
ARI treatment								
0-5 months	25	0.80		N/A		N/A	28	0.53
6-11 months	29	0.86		N/A		N/A	65	0.76
12-23 months	43	0.79		N/A		N/A	125	0.68
0-23 months	97	0.81		N/A		N/A	218	0.68

In terms of feeding, while MCDP children under six months have similar likelihood to be exclusively breastfed than the national data (Table 6.6), they have higher rates of continued breastfeeding and initiation of complementary foods. The relatively high rates of continued breast feeding from 12-15 months and initiation of complimentary foods at 6-8 months suggest that the transition to solid foods is not a critical period of vulnerability for this group.

Table 6.6 Comparison of Infant and Young Child Feeding, DHS versus MCDP

	MCDP, 2014		DHS, 2013-14	
	N	Percent	*N*	Percent
Exclusive breastfeeding, age 0-1 months	60	0.97	310	0.94

Exclusive breastfeeding, age 0-3 months	119	0.86	752	0.89
Exclusive breastfeeding, age 0-5 months	163	0.76	1,205	0.73
Exclusive breastfeeding, age 2-3 months	59	0.75	442	0.85
Exclusive breastfeeding, age 4-5 months	44	0.51	453	0.45
Currently breastfeeding, age 12-15 months	97	0.97	898	0.92
Complementary foods, age 6-8 months	71	0.93	631	0.80

There are three main conclusions from our analysis in this section. First, while poor, MCDP households are more food secure than CGP 2013 households, possibly related to the smaller household sizes which could positively affect availability of existing resources. This result is favourable to the programme, considering food security will not likely be affected by any of the planned interventions, but lack of food security could decrease the likelihood of the programme to impact nutritional outcomes. Second, the MCDP malnutrition rates are on par with both CGP and DHS data, showing that the targeting strategy of the programme in finding vulnerable children has been successful, particularly for stunting rates. Finally, children in MCDP households are more likely than other rural Zambian children (using CGP data), to be ill from fever, cough, and diarrhoea, making them a vulnerable population. Programme children have little room for improvement on some feeding outcomes, including exclusive breast feeding for children less than one month old, as well as complementary feeding and continued breast feeding to one year.

7. Baseline Equivalence between Treatment and Comparison Groups

One purpose of the baseline survey is to assess the equivalence between the treatment and comparison groups along outcome indicators and demographic characteristics. Our analysis suggests there is sufficient balance in observable characteristics across the treatment and the comparison group for a rigorous nonexperimental impact evaluation. Of the 42 indicators and control variables we examined for baseline equivalence, 16 show relatively small but statistically significant differences between the treatment and comparison groups (p-values of 0.05 or below). Although there are some statistically significant differences, the magnitude of the differences is small. Our proposed difference-in-differences analysis with control variables will allow for controlling for these small differences as well as the differences in time-invariant unobservable characteristics. Thus, the comparison districts of Katete and Nakonde can serve as an appropriate counterfactual for Chipata and Katete. We describe and show all of the indicators, including those with significant differences in Table 7.1.

Of the indicators that capture knowledge about appropriate practices to improve nutrition outcomes, six indicators that focus on infant and young child feeding knowledge show small but statistically higher levels of knowledge for the treatment group than for the comparison group; however, we only find one significant difference for indicators that focus on behaviour. For the variables that focus on knowledge, we find significant differences for knowledge variables that focus on breastfeeding, complementary feeding, diet diversity, and parenting practices that are linked to infant and young child feeding. The prevalence of hand washing is also significantly higher in the treatment group. However, we find no significant differences in other indicators that focus on knowledge and behaviour. In addition, the majority of the differences are not very large. The magnitude of the differences in variables that emphasize knowledge and practices ranges from 0.24-0.50 standard deviations.

Our baseline findings further show that indicators of child health in the treatment group are worse than in the comparison group. For example, the treatment group has a higher incidence of diarrhoea and upper respiratory illness among children of 0-2 years old. Furthermore, our findings show that the incidence of stunting is higher in the treatment group. However, again the differences are relatively

small ranging from 0.14-0.32 standard deviations.

Our results also demonstrate significant differences across the treatment and the comparison group for health seeking behaviour. We find that seeking treatment for fever and upper respiratory illness is lower in the treatment group. However, we also find that seeking treatment for diarrhoea is marginally but significantly higher in the treatment group. The differences in health seeking behaviour are again relatively small and can be controlled for in the statistical analysis.

We also only find few and relatively small significant differences across the treatment and comparison group for the background characteristics that we will use as control variables. First, the treatment group has slightly larger households and scores better in terms of food security. Second, the marriage rate in the comparison group is higher. But we do not find other significant differences

Of the 16 variables which show a statistically significant difference between treatment and comparison groups, none are a major concern for the validity of the impact evaluation. The difference-in-differences model we plan to use will allow us to control for the observed differences between the groups at baseline as well as unobserved differences that are time-invariant. The differences in Table 7.1 show the magnitude of the difference between the treatment and the comparison group. As indicated above, the differences are relatively small. A difference of 0.2 standard deviations is commonly accepted as a small difference (Cohen, 1992). The differences in Table 7.1 range from 0.14 to 0.50 standard deviations, with a mean difference of 0.28 standard deviations across the treatment and comparison group. The full table of 45 indicators and control variables can be found in Appendix B.

Table 7.1 Mean Differences between Treatment and Comparison Groups

Variables	Comparison Mean	*N* 1	Treatment Mean	*N* 2	Mean Diff	p-value	Standardized Difference
Feeding Knowledge							
Early initiation of breastfeeding	0.79	600	0.76	600	-0.03	0.59	-0.07
Exclusive breastfeeding under 6 months	0.82	600	0.91	600	0.09	*0.00*	0.25
Exclusive breastfeeding definition	0.08	599	0.04	600	-0.04	0.13	-0.15
Complementary feeding	0.75	600	0.75	600	0.00	0.93	0.01
Minimum feeding	0.52	597	0.48	595	-0.05	0.34	-0.09
Minimum diet diversity	0.12	600	0.24	600	0.12	*0.00*	0.30
Feeding after illness	0.11	600	0.32	600	0.21	*0.00*	0.50
HIV transmission through breast milk	0.12	600	0.21	600	0.09	*0.00*	0.24
HIV prevention through breast milk	0.47	600	0.41	600	-0.05	0.34	-0.10
Responsive to child refusal of food	0.71	499	0.70	476	-0.02	0.79	-0.03
Location of child during feeding	0.04	600	0.09	600	0.06	*0.02*	0.23
Verbal actions during feeding	0.20	600	0.19	600	-0.00	0.95	-0.00
Response to child attempts to self-feed	0.81	600	0.68	599	-0.13	*0.00*	-0.30
Feeding Practices							
Early initiation of breastfeeding (%)	0.72	604	0.68	600	-0.04	0.30	-0.09
Exclusive breastfeeding under 6 months (%)	0.74	152	0.76	163	0.02	0.64	0.06
Continued breastfeeding 12-15 months (%)	0.92	133	0.90	104	-0.02	0.62	-0.08
Introduction of solid, semi-solid or soft foods 6-8 months (%)	0.90	78	0.83	71	-0.07	0.23	-0.19
Children who receive food from 4	0.35	449	0.37	430	0.02	0.76	0.04

or more food groups 6-23 months (%)							
Minimum meal frequency (%)	0.51	437	0.44	423	-0.07	0.10	-0.14
Minimum acceptable diet (%)	0.14	604	0.14	600	0.00	0.87	0.01
Consumption of iron-rich or iron-fortified foods 6-23 months (%)	0.74	451	0.69	437	-0.04	0.41	-0.09
Child Health and Nutrition							
Diarrhoea last two weeks	0.21	603	0.27	599	0.06	*0.02*	0.14
Fever last two weeks	0.23	602	0.29	597	0.06	0.11	0.14
ARI last two weeks	0.09	604	0.16	600	0.07	*0.00*	0.22
Child is fully vaccinated	0.53	604	0.47	600	-0.06	0.09	-0.12
Child taken to well-baby or under 5 clinic (last 6 months)	0.92	603	0.94	600	0.02	0.25	0.08
Sought treatment for diarrhoea	0.72	125	0.73	161	0.01	0.91	0.01
Sought treatment for fever	0.24	140	0.28	176	0.04	0.46	0.09
Sought treatment for ARI	0.93	54	0.81	97	-0.11	0.06	-0.31
Wasted	0.11	582	0.07	545	-0.04	0.10	-0.14
Stunted	0.25	582	0.34	547	0.09	*0.01*	0.19
Underweight	0.09	601	0.11	594	0.02	0.48	0.05
Water, Sanitation and Hygiene							
Hand washing	0.47	600	0.68	600	0.21	*0.00*	0.43
Safe disposal of child faeces	0.94	600	0.97	600	0.03	0.06	0.14
Drinking from improved water source	0.48	598	0.33	599	-0.15	0.12	-0.31
Improved/hygienic latrine	0.03	600	0.06	600	0.03	0.12	0.15
Background Controls							
Mother's age, years	27.40	603	27.47	598	0.07	0.87	0.01
Mother's education, highest grade completed	4.61	604	8.25	600	3.64	*0.00*	0.27
Married mother	0.93	604	0.84	600	-0.09	*0.00*	-0.28
Father's age, years	31.89	548	32.25	495	0.37	0.60	0.04
Father's education, highest grade completed	6.28	604	7.01	599	0.73	0.24	0.09
Married father	0.96	604	0.90	600	-0.07	*0.00*	-0.26
Household size	5.47	600	5.82	600	0.34	*0.03*	0.16
Severely food insecure	0.52	600	0.34	600	-0.18	*0.00*	-0.36

Note: Clustering at the CWAC level.

8. Conclusion

The primary purposes of the baseline report are to describe the sample before receiving the programme and to present the equivalence of the treatment and comparison groups. Describing the sample at baseline helps stakeholders assess if they have accurately targeted the type of people they want to benefit from the programme. Additionally, it helps stakeholders understand where beneficiaries need more assistance and how best to design the programme to meet beneficiary needs. We find from the baseline survey that the programme enrols young families where a large majority of the mothers are married and care for young children. Households are food insecure, very poor, and many do not have access to clean water or a latrine. These characteristics affect child nutrition, however they are not directly addressed by the MCDP; thus, these characteristics could pose a challenge for the MCDP to positively impact child nutrition. As an example, results from the CGP cash transfer evaluation found that the programme only has an impact on child nutrition for households with access to clean water. This result makes sense in that it is difficult for additional food and a better balanced diet to help a child's nutritional status if the child is continually sick with diarrhoea and unable to properly absorb the

additional food. Thus, the benefits of the CGP are lost to the negative effect of unclean water. This same result could occur in the MCDP since access to clean water and sanitary latrines are a problem.

Findings from the RQA suggest two other potential moderating factors for MCDP interventions: time constraints and lack of money. First, pregnant women and mothers of children under two interviewed during the RQA reported having very little discretionary time, which could impede their ability to uptake MCDP services (particularly if they have to travel long distances to the clinic, for example) or adhere to guidance given by the programme if it proves too time consuming. Second, a number of mothers interviewed indicated that they were aware of recommended feeding practices but simply could not afford to purchase the necessary foods to follow them.

Our baseline report focuses on four domains of outcomes of interest to the programme: mother's knowledge of feeding and hygiene practices, mother's behaviour for feeding and hygiene practices, child health, and child nutrition. We find that mothers know about proper feeding with respect to frequency, but many do not know about diet diversity and how breastfeeding relates to HIV prevention/protection. Similarly we find that mothers have proper practices for the frequency and duration of breastfeeding, but do not practice diet diversity for young children or initiate breastfeeding at the right time. Findings suggest that the MCDP should focus efforts on mother's knowledge and practice of diet diversity, initial breastfeeding, and HIV prevention. With regards to children's health, we find that many mothers are good about seeking treatment for their infant when s/he is sick, however less than half of the children under two years old have been vaccinated. Therefore, we suggest that the MCDP focus efforts on messaging to mothers about the importance of vaccinating their children at the appropriate age. Last, we find that stunting is a fairly high problem among the children under two years old in the population. All of the interventions in the MCDP package can ultimately affect stunting, so this indicator will be important to track over time with the hope of seeing some improvement (given the caveats mentioned above about moderators that may challenge the programme's ability to bring about changes in stunting).

In addition to describing the sample, we also investigate baseline equivalence. We care about baseline equivalence purely as a technical aspect of the study design because it helps assess the internal validity of the study (i.e., the ability of the study to attribute causality to the programme when differences are observed between the treatment and comparison groups at the end of the study), and tells us what factors we need to control for in our analysis of impacts. We find that for the most part the comparison group serves as a good counterfactual because the samples are very similar across domains of interest to the programme, both in outcome indicators and demographic characteristics that are associated with outcomes of interest. The differences that we observe between the groups are relatively small and are statistically different as a result of our large sample size. We can control for these small differences in our analysis and believe that they are not a threat to the internal validity of the study.

Overall, we find that the study is properly designed to assess programme impacts and inform stakeholders about where the programme works and areas for improvement. The programme properly targets households that are very poor, food insecure, and require assistance. There are a number of indicators in the four domains of interest where beneficiary households could use support to improve their status. The programme is designed to address these domains and help beneficiaries, so there is good reason to believe that we will observe impacts in some areas. However, it is important to note that factors beyond the scope of the MCDP that also affect child nutrition could hinder the programme's ability to generate strong effects. The study will track these moderating factors and investigate their possible effect at the follow up round in 24 months.

Appendix A. Examples of Calculated Household Scores

Variables	Categories	Contr. scores	Examples		
			First	Second	Third
Highest education level achieved by a household member 15 or above	No education	-542	X		
	Year 1-3	-364			
	Year 4-6	-223			
	Year 7	-70			
	Year 8-9	95		X	
	Year 10-12	280			X
	Above	511			
Type of toilet	None/bucket	-348			
	Pit without slab	8	X	X	
	With slub/flush	366			X
Type of roof	Grass/straw/thatch	-157	X		
	Iron/non asbestos tiles	279		X	X
	Asbestos tiles/ concrete	572			
Source of lighting is electricity/solar panel	No	-72	X	X	
	Yes	596			X
Cooking fuel	Firewood	-98	X		X
	Charcoal	319		X	
	Electricity	556			
Has mattress	No	-296		X	
	Yes	191	X		X
Has sofa/lounge suit	No	-115	X		X
	Yes	511		X	
Has television	No	-97	X	X	
	Yes	568			X
Has clock	No	-71			X
	Yes	509	X	X	
Has electric iron	No	-49	X	X	
	Yes	679			X
Household score			-422	1207	2675
Final score			**206**	**442**	**655**

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