BASELINE SURVEY REPORT

December 12, 2011

SCIP – Ogumaniha:

Improving health and livelihoods of children, women and families in the Province of Zambézia, Republic of Mozambique

Phase I and II: Zambézia-wide

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Table of Contents

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Index of Tables

Index of Figures

Executive Summary

The Ogumaniha[1] Project began implementation in Zambézia Province, Mozambique in late 2009. The project is funded by the US Government under USAID's Strengthening Communities through Integrated Programming (SCIP) grant and is implemented by a consortium of partners led by World Vision. The broad goal of the 5-year project is to reduce poverty in Zambézia by pursuing the consolidation of an integrated, innovative, and sustainable community-based program supporting cross-sector integration of USAID's development actions in the province.

Ogumaniha's overall goal is to "to improve health and livelihoods of children, women and families in the Province of Zambézia." To achieve this goal, Ogumaniha objectives are to:

1. Strengthen and increase access to the health, nutrition and HIV&AIDS care system for its numerous target groups, including: women and men of reproductive age, pregnant and post-partum women, newborns, children under 5 years of age, orphans and vulnerable children (OVC) and people living with HIV/AIDS (PLWHA);

2. Promote and finance demand-driven community investments for agricultural production, value chain additions, income-generation, health improvement, potable water, and sanitation; and

3. Build and reinforce existing institutional capacity of governmental departments at provincial and district level, and community associations, councils, and groups, to empower them to make decisions that are directly related to improving the living conditions of the rural population.

This project is in line with the priorities of the Ministries of Health (MOH), Agriculture (MOA), and Public Works and Housing (MOPH), and in strong coordination with and leadership from the Zambézia Provincial Health Directorate (DPS), the Provincial Agriculture Directorate (DPA) and the Provincial Directorate of Public Works and Housing (DPOPH).

Integral to Ogumaniha's design is a strong monitoring system and project evaluation, based on performance indicators agreed upon with USAID and the provincial government. Because the project uses multi-sectoral interventions and an interdisciplinary approach to implementation, in addition to its strong focus on poverty reduction, the consortium opted for an evaluation design that reflects these criteria. A survey instrument to be used at baseline and at project end was designed based on human development theory originated by Amartya Sen (1999) and further developed by researchers from the Oxford Poverty and Human Development Institute (OPHI). This instrument uses multiple dimensions to measure poverty including health, education, income, access to goods and services and self-empowerment. The OPHI is one of the principal contributors to the United Nation's Human Development Index (HDI), and is proposing revisions based on its methodology to improve the index (Alkire and Santos, 2010).

The vision of this evaluation is that the information collected can provide a better picture to measure the impact of this large-scale intervention on the health and well being of the households in Zambézia Province, so that this evaluation design can serve as a model for evaluating health and development interventions in Mozambique. The evaluation explores: 1) Zambézia -wide changes in selected indicators directly linked to project interventions, and 2) Changes related to project intervention intensity in the three focal districts of Namacurra, Morrumbala, and Alto Molócuè.

The survey tool was developed by a multi-disciplinary team of researchers including staff, faculty, and graduate students from Vanderbilt University and the University Eduardo Mondlane. Faculty and students involved were from the Departments of Community Medicine, Preventive Medicine, Infectious Diseases,

[1] In the local Chuabo language, *ogumaniha* means "united/integrated for a common purpose."

Pediatrics, Epidemiology, Nutrition, Anthropology, Political Science and the Schools of Nursing, Education, Management, Engineering, and Divinity. The survey designers borrowed many questions and scales deemed appropriate from previous national surveys in Mozambique (including various INE surveys focusing on poverty and economic status) and other international surveys (DHS and MICS). The survey was made available to technical and leadership staff at World Vision and each of the consortium partners who provided feedback on questions and design.

Data collection for the baseline survey was conducted between 8 August and 25 September, 2010. Fourteen teams of 5 individuals–a team leader and four interviewers–conducted the data collection in two phases, collecting data first on a Zambézia-wide sample to provide province-wide estimates, and a second phase collecting data in the three focal districts of Namacurra, Morrumbala, and Alto Molócuè.

Interviews were conducted with female heads of household and covered various topics, including sociodemographics, knowledge, attitudes, practices and access to health and HIV-related services and products, access to improved water and sanitation, nutritional intake, agricultural production, and others. Interviews were conducted either in Portuguese or in one of the five predominant languages of the province, and data was collected using mobile cell phones. Satellite maps along with topographic maps provided by the National Institute for Statistics (INE) were used to locate enumeration areas to be covered. Anthropometric measures of a random selection of children under 5 years residing in participating households were also included.

This report covers the analysis of general estimates of the Ogumaniha project indicators. It is based on the data collected in Phase I of a sample representative of all Zambézian households.

An additional series of analyses focusing on specific questions relevant to the project and incorporating both Phase I and Phase II data will be carried out and published by June 2011. These analyses will be informed by consultation with government and consortium partners that will be carried out during data dissemination meetings in the months of October and November 2010.

Key findings from the survey are as follows:

1. Reproductive health, pregnancy and antenatal care:
    - Although 31.2% of women interviewed expressed a desire to limit or space births, only 13.4% were using modern contraceptive methods.
    - Reported rates of condom use among all female heads of household participating in the survey was 2.1%. There appears to be no change in reported use of condoms among women in stable relationships between the DHS survey of 2003 (DHS, 2003) and this survey's results.
    - Access to antenatal care (ANC) services are still limited (59.1% of women had some ANC during last pregnancy).
    - Receipt of a complete package of antenatal services is limited. For example, of women receiving antenatal care during their last pregnancy, only 67.4% received fansidar, 68.2% vitamin A supplements, 47.7% mosquito net, 40.9% HIV counseling and testing. Fully, 22.9% of women receiving ANC had all services including fansidar, tetanus toxoid, vitamin A and iron supplements, a bednet and HIV counseling and testing.
    - Only 28.9% of all women interviewed reported that they had been offered counseling and testing for HIV during their last pregnancy.
    - About 44.5% of respondents slept under a mosquito net the night previous to the interview, and 32.5% reported doing so during their last pregnancy.

2. Child health:

   - Data on immunization coverage was limited in part because as children get older, vaccine cards are lost and memories of what immunizations were provided fade. An estimated 64.2% of children under five had a vaccination card.
   - About 58.8% of children less than one month of age had received BCG and OPV at birth.
   - Among children 13 to 59 months 66.9% are fully vaccinated based solely on vaccination card record. Among children aged 13 to 59 months 48.5% had no card AND the mothers report them to be fully vaccinated.
   - Based on these two estimates, the total proportion of all children 13 to 59 months of age who are fully vaccinated is 59.1% of children.
   - Our survey likely overestimates the proportion of fully vaccinated children by overestimating those reporting to be fully vaccinated among those children without a vaccination card.
   - MICS 2008 reports 47% of Zambézia's 12 to 23 month olds are fully vaccinated (MICS, 2008). In comparison, among the 123 households with a 12–23 month old, 55.5% of those surveyed here were fully vaccinated.
   - The prevalence of diarrhea and/or respiratory ailments in last month prior to the survey were high. Over half (55.3%) of households reported children aged 0–59 months suffering from fever, 33.3% from diarrhea, and 33.3% respiratory problems in the four weeks prior to survey. When these health problems presented, a majority of the mothers (65 to 90% depending on the symptoms) sought advice in health facilities. Only a very small proportion of mothers (roughly 2%) reported seeking advice from traditional healers for these childhood symptoms.
   - All mothers of children aged 0–59 months reported seeking some form of help if their children had diarrhea, and 77.4% reported using ORT.
   - About 68.2% of mothers of children aged 0–59 months had heard about the oral rehydration product Mistura, and roughly 20% could not name a single instance when they knew they had to take sick child to health clinic.

3. Health services knowledge and access:

   - Only 42.1% of respondents knew of the existence of HIV counseling and testing services in the Province, and only 38.6% knew that HIV infection can be treated.
   - Knowledge of prevention and HIV transmission was low, with as few as 20% of respondents unable to name even one mode of transmission, or prevention methods (between adults or mother-to-child).
   - Utilization of government health services was fairly low, with only 73.1% of respondents reporting ever having visited a health facility, and 43.1% reported having visited a traditional healer.

4. Livelihoods, water and sanitation, and nutrition:

   - An estimated 80.7% of households respondents do not treat drinking water in any way, and over 62.7% do not use a latrine. Of those who use a latrine, 71.8% use an unimproved latrine.
   - 33.8% of the respondents reported having no food of any kind in the house during the four-week period prior to the interview due to lack of resources, and 16.9% of them reported that this happened frequently.
   - Over one quarter (30.4%) of respondents reported their household received no income of any kind, and an roughly half reported receiving some income, up to 1,000 Meticais (monthly equivalent of about 30 USD – Sept 2010). Therefore the proportion of households estimated having an income of less than 1 USD per day is around 75%.

- An estimated 89.9% of respondents report that the household cultivates a small farm, and of those, 83.5% do not report use of any conservation farming technique.
- Of farming households, the most commonly grown crops are maize (66.9%), cassava (53.1%), rice (31.5%), and cow pea (23.1%), peanut (16.9%), and sweet potato (16.7%).
- Among farming households, only about 29.1% produce enough to sell, and sell mostly maize (49.9%) and cassava (14.2%).
- A high proportion of children under five years of age are severely (19.9%) and moderately (39.2%) chronically malnourished (stunted). These data are comparable to previous values reported for Zambézia although they appear to have decreased since 2003 (DHS, 2003).

Next steps

Information from the survey will be disseminated to Ogumaniha partners and government officials in the weeks following completion of the survey through a series of fora. One assessment will be designed to be conducted in Year 2 of Ogumaniha implementation, based on the discussions from the partner forum. Lessons learned from the data collection period will be summarized in a separate document and will guide the implementation of the final, medium-term impact evaluation to be conducted at the end of Ogumaniha's project period.

Phase II findings will next be analyzed and disseminated, to provide concrete information on the three focus districts for the Ogumaniha project. The Phase II findings will provide further guidance on programmatic areas needing particular attention during project implementation. Both Phase I and Phase II data will be used together to review project targets defined in the Ogumaniha Project Monitoring Plan, revising them should the need arise.

Separate secondary analyses will be conducted on both Phase I and Phase II data. One of the analyses will assess the poverty levels of the community based on the Oxford University multidimensional definition of poverty. Additional analyses will emerge from the forum discussions as well as from a meeting of all those involved in the development of the survey instrument during a 2-day meeting to be held at Vanderbilt University in mid-November.

Introduction

Ogumaniha Background

The Ogumaniha[1] Project began implementation in Zambézia Province, Mozambique in late 2009. The project is funded by the US Government under USAID's Strengthening Communities through Integrated Programming (SCIP) grant and is implemented by a consortium of partners led by World Vision. The broad goal of the 5-year project is to reduce poverty in Zambézia by pursuing the consolidation of an integrated, innovative, and sustainable community-based program supporting cross-sector integration of USAID's development actions in the province.

Ogumaniha's overall goal is to "to improve health and livelihoods of children, women and families in the Province of Zambézia." To achieve this goal, Ogumaniha objectives are to (a) strengthen and increase access to the health, nutrition and HIV&AIDS care system for its numerous target groups, including: women and men of reproductive age, pregnant and post-partum women, newborns, children under 5 years of age, orphans and vulnerable children (OVC) and people living with HIV/AIDS (PLWHA) (b) promote and finance demand-driven community investments for agricultural production, value chain additions, income-generation, health improvement, potable water, and sanitation; and (c) build and reinforce existing institutional capacity of governmental departments at provincial and district level, and community associations, councils, and groups, to empower them to make decisions that are directly related to improving the living conditions of the rural population.

This project is in line with the priorities of the Ministries of Health (MOH), Agriculture (MOA), and Public Works and Housing (MOPH), and in strong coordination with and leadership from the Zambézia Provincial Health Directorate (DPS), the Provincial Agriculture Directorate (DPA) and the Provincial Directorate of Public Works and Housing (DPOPH). Ogumaniha capitalizes on structures, experiences, and relationships built by numerous previous and ongoing projects of its consortium members, including USAID-funded COACH, RITA, MozArk, TAM, and MYAP programs, and CDC-funded PEPFAR programming. Ogumaniha is being implemented under the leadership of World Vision as the prime recipient of the funds with key roles and responsibilities assumed by six experienced and uniquely qualified partners: Adventist Development and Relief Agency (ADRA), ACDI/VOCA, International Relief and Development (IRD), Vanderbilt University – Friends in Global Health (FGH), John Hopkins University's Center for Communication Programs (JHU/CCP), and Red Cross Mozambique/Cruz Vermelha Mozambicana (CVM). Ogumaniha is also testing an innovative approach to Public-Private Partnerships by leveraging impact with the support of General Mills International, MCel, World Bicycle Relief, and Opportunity International.

Ogumaniha Context

The percentage of the population living in extreme poverty in Mozambique is 54% (PARPA II, 2006), which translates to ten million Mozambicans trying to meet their basic human needs on an income of less than one US dollar a day (PARPA II, 2006). The major elements contributing to the vulnerability of its people are the lack of social infrastructure, poor health and sanitation, food insecurity (low levels of food production, frequent food shortages, lack of alternative sources of income, and poor access to markets), and spread of diseases, especially HIV/AIDS. Because many rural areas have undeveloped markets and suffer from lack of infrastructure, the population's livelihood in those areas revolves around subsistence farming and informal production and trade. It is therefore difficult to compare social, economic and human development and its impact on health in a context where there is tremendous diversity in the means of production and trade. The HIV adult prevalence in Mozambique has increased rapidly, from 13% in

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2002 to 16% in 2006 (MISAU, 2008). The national HIV prevalence was estimated to be 13% in the latest national survey of HIV (2009), using more accurate population based sampling methods (MISAU, 2009); however, it varies significantly by location with rural areas and areas with limited population movement demonstrating lower prevalence.

Located in central Mozambique, Zambézia is a remote, underdeveloped province with rich agricultural potential but chronically vulnerable to livelihood insecurity. Health service access is extremely low: there exist only one Provincial Hospital, five rural hospitals, 179 health centers (of which only 127 have maternity services) and 153 vaccination fixed posts to cater to the almost 3.8 million people living in the province. Even though the overall HIV prevalence in Zambézia is estimated to be 13% (MISAU, 2009), seropositivity among pregnant women attending antenatal services in selected urban areas ranges from 14 to 35% (MISAU, 2008). The maternal mortality rate is high, at 410 maternal deaths per 100,000 live births, partly because of the remoteness of communities and lack of access to emergency care; Infant mortality is 90 out of 1,000 live births and newborn mortality is 35 out of 1,000 live births (UNICEF, 2010a).

Background to Ogumaniha Survey

Integral to Ogumaniha's design is a strong monitoring system and project evaluation, based on performance indicators agreed upon with USAID and the provincial government. Because the project uses multi-sectoral interventions and an interdisciplinary approach to implementation, in addition to its strong focus on poverty reduction, the consortium opted for an evaluation design that reflects these criteria. A survey instrument to be used at baseline and at project end was designed based on human development theory originated by Amartya Sen (1999) and further developed by researchers from the Oxford Poverty and Human Development Institute (OPHI). This instrument uses multiple dimensions to measure poverty including health, education, income, access to goods and services and self-empowerment. The OPHI is one of the principal contributors to the United Nation's Human Development Index (HDI), and is proposing revisions based on its methodology to improve the index (Alkire and Santos, 2010). The vision of this evaluation is that the information collected can provide a better picture to measure the impact of this large-scale intervention on the health and well being of the households in Zambézia Province, so that this evaluation design can serve as a model for evaluating health and development interventions in Mozambique.

The evaluation will explore the following: 1) Zambézia -wide changes in selected indicators directly linked to project interventions, and 2) Changes related to project intervention intensity in the three focal districts of Namacurra, Morrumbala, and Alto Molócuè. This report will focus on Zambézia-wide indicator estimates for the baseline survey. Additional analysis work on the three focus districts will be completed during year 2, and will be used for comparative analysis with information obtained from the end of the project survey in year 5.

Survey Design

The survey instrument was designed to achieve three objectives:

- To provide baseline estimates of selected indicators that are representative of the households of the entire Zambézia Province,
- To provide estimates for as many project indicators as possible, where the information sought would be most appropriately collected in a population-based survey, and
- To collect a sufficient number of multi-dimensional indicators to be able to apply the Oxford Poverty and Human Development methodology to evaluate the medium term impact of the project.

This report presents information only on baseline project indicators for the Zambézia-wide sample. These indicator estimates are representative of the entire population of Zambézia. Additional work on poverty measures will be developed and presented during the second year of the project.

The survey tool was developed by a multi-disciplinary team of researchers including staff, faculty, and graduate students from Vanderbilt University and the University Eduardo Mondlane. Faculty and students involved were from the Departments of Community Medicine, Preventive Medicine, Infectious Diseases, Pediatrics, Epidemiology, Nutrition, Anthropology, Political Science and the Schools of Nursing, Education, Management, Engineering, and Divinity. The survey designers borrowed many questions and scales deemed appropriate from previous national surveys in Mozambique (including various INE surveys focusing on poverty and economic status) and other international surveys (DHS and MICS). The survey was made available to technical and leadership staff at World Vision and each of the consortium partners who provided feedback on questions and design.

The first part of the survey collects demographic information about all household members and includes household language and ethnicity. The second part collects child health information, including questions about vaccinations, malaria, diarrheal disease, respiratory disease, and measures of weight and height to estimate malnutrition. This set of questions was primarily selected and adapted from the Demographic and Health Survey 5 (DHS5) – Model Women's Questionnaire (DHS, 2006). The survey tool includes two instruments adapted from the Wide Range Achievement Test (WRAT-1) to measure literacy and numeracy of the interviewee (Wilkinson, 1993). Questions on education achievement and aspirations were designed based on previous instruments used in Malawi (Grant, 2008; Lockheed et al., 1989). The next section of the instrument focuses on food security, dietary diversity and food coping strategies. These questions were adapted from the Household Food Insecurity and Access Scale (HFIAS) of the Food and Nutrition Technical Assistance Project (Coates et al., 2007), as well as from Food and Agriculture Organization and other resources (FAO Nutrition and Consumer Protection Division, 2008; Tirivayi et al., 2009). The section on social barriers and social participation addresses various factors that shape well-being, from access to social support networks to decision making within the family and gender differences. Questions in this section were selected from the Oxford Poverty and Human Development Initiative, UNICEF and others (Oxford Poverty and Human Development Initiative, 2010; Buiya et al., 2007; Pulerwitz and Barker, 2007; ChildInfo, 2010). Questions on material possessions and consumption of goods were adapted from several sources based primarily on the unsatisfied basic needs approach, where the aim is to estimate use or acquisition of assets presumed critical for well being. Questions were included from the Demographic and Health Survey, the Multiple Indicator Cluster Survey as well as from other sources (DHS, 2010; Government of South Africa, 2007; Pradhan and Ravallion, 2000; World Bank, 2007; UNICEF, 2010a). The section on reproductive health relied heavily on DHS questions, as were the sections on malaria and HIV knowledge, attitudes, and practices. Questions related to HIV/AIDS stigma were primarily adapted from the Brazilian truck driver stigma study (Population Council, 2003). The section related to quality of life were based several on WHO quality of life scales (WHO, 1997, 1998, 2002). Questions related to agency and self determination were partly adapted from the Social Support Appraisal's Scale (Vaux et al., 1986). Questions about income and income generation were adapted from the Core Welfare Indicators Questionnaire (QUIBB/CWIS) survey (Wold, 2004) as well as the DHS. Agricultural practice and production questions were based on surveys previously used by World Vision and other partners in Zambézia.

The survey was designed to collect information about the household from the female head of household, defined as the principal wife of the nuclear (immediate) family. The female head of household was selected to be the interviewee, because she is thought to be person likely most familiar with the health and caretaking of all household members, including nutrition, food procurement, cooking, water and sanitation, health events and health care access, and agricultural practices. In cases of polygamous families, the principal or eldest wife was selected, which may introduce some bias if the younger wives and their children are less

well off.

Initial revisions were done prior to field testing in order to adapt the Portuguese version of the document to reflect the linguistic and social context of Mozambique. Field tests were then conducted in the districts of Namacurra and Quelimane to localize the questionnaire in rural and urban communities. The draft questionnaire was then revised and tested again in Alto Molócuè, Namacurra, Morrumbala, and Quelimane at district training workshops. These field tests ensured that the way questions were phrased and the logic of the instrument worked in the field; particular attention was paid to whether answers were best collected in categories, ranges, or scales depending on the solicited response. Field testing was conducted with the support of experienced staff from Vanderbilt's Latin American Public Opinion Project (LAPOP).

Once the survey was deemed ready in Portuguese it was translated to the five principal local languages in Zambézia (INE, 2007): Nyanja, Elomwe, Emakhwa, Chisena, and Echuabo by faculty at the *Universidade Pedagógica de Quelimane*. Further revisions were made in the local language versions in order to ensure that the versions were consistent across all languages, and field staff members were trained by the translation team to ensure that the instruments reflected the spoken and not the formal languages. These were then back-translated to Portuguese by staff fluent in those languages to verify translation accuracy. The Portuguese version was then encoded onto a software platform to enable interviewers to use mobile phones to collect survey data. Paper questionnaires were available in five local languages. Interviewers were trained to conduct interviews in local languages reading from the paper instruments to ensure consistency of query, and entering responses into the Portuguese form on the mobile phones.

Anthropometric Measures

We assessed nutritional status of Zambézian children under age five using anthropometric indicators – physical body measurements including height and weight along with attributes such as age and sex (O'Donnell et al., 2008). Weight-for-height (W/H) measures body weight relative to height. Weight-for-height is normally used as an indicator of current nutritional status, and can be useful for screening children at risk. Extreme cases of low W/H are commonly referred to as "wasting". Height-for-age (H/A) reflects cumulative linear growth. H/A deficits indicate past or chronic inadequacies nutrition and/or chronic or frequent illness. Extreme cases of low H/A, where shortness is interpreted as pathological, is referred to as "stunting". Weight-for-age (W/A) reflects body mass relative to age; the term "underweight" is commonly used to refer to severe or pathological deficits in W/A. W/A is commonly used for monitoring growth and to assess changes in the magnitude of malnutrition over time. Anthropometric indices are constructed by comparing relevant measures with those of comparable individuals (in terms of age and sex) in the reference data (WHO child growth charts). This comparison is often expressed as a Z-score (standard deviation score): the difference between the value for an individual and the mean value of the reference population for the same age or height, divided by the standard deviation of the reference population.

For this survey, we were to randomly select one child under age 12 months and one child age 13 to 59 months in selected enumeration areas to conduct anthropometric measurements. Children's measurements were carried out following WHO recommendation for children's nutritional anthropometry (WHO expert committee, 1995). All measurements were conducted by the survey team leaders, who received extensive training on measuring height and weight of children. Weight for children was measured using a Salter scale. The scales were calibrated upon arrival to each household where a child was to be measured using a 5-kg sack of sand. Children 12 months or younger were placed in a halter and weighed, whereas children over 12 months were placed upon a swing designed specifically for the study and measured. Length/height for children was measured using altimeters designed for the study. Children 12 months or younger were measured lying down, while children over 12 months were measured standing up. This age cutoff for

measuring height/length was chosen over the more common 2 years, to make it consistent with other age specific questions in the survey and to avoid confusion among the survey enumerators.

Survey Implementation Plan

Interviewers and team leaders were recruited from a pool of women with prior experience in survey work, prioritizing geographical areas where the 5 most common local languages in Zambézia were spoken. Fourteen teams of 5 women were formed composed of one team leader and four interviewers. The teams were assigned by language abilities to a specific region to work under the supervision of a regional supervisor. The team leaders were responsible for the operational side of the survey, including the following tasks: accompanying interviewers to the enumeration areas (EAs), ensuring that GPS localization was conducted upon arrival to new EA, supervising the selection of households in all EAs, assigning interviewers to selected households, conducting the random sampling and anthropometric measurement of children aged 0-59 months in selected EAs, backing up data, maintaining registers of data collection for each member of their team, keeping supervisors well-informed of activities, and charging phones.

Data were to be collected in two phases. During phase I, data was collected in 66 EAs representative of the Zambézia Districts where Ogumaniha activities are being carried out. Phase II, a more intensive sample of 3 large districts, was implemented to be better able to detect changes from baseline to the end of the project period. All planning, logistics, and troubleshooting were orchestrated by a survey coordinator, with the help of three regional supervisors.

Interviewers were trained on general aspects of survey conduct, including: ethical behavior and confidentiality, obtaining consent, procedures for locating the pre-selected enumeration areas, selecting a random child in the appropriate age groups for anthropometry and child health questions, scenarios requiring termination of an interview, procedure to use when no eligible head of household is present, procedures to engage local political and traditional authorities to obtain authorization to conduct interviews in a given locality, etc. Training took place in various locations, over a period of 4 weeks, and included training to provide clarification of specific meaning and appropriateness of specific translations used in the local language questionnaires.

A lot of care was taken to ensure that local authorities at multiple levels were aware of the survey activities, providing their sanction in order to facilitate acceptance into communities and survey completion. Upon arrival into each district, each of the survey teams were to present themselves to the District Administrator, to introduce the survey, produce all necessary governmental and ethical review approvals, explain the methodology, and identify the enumeration areas where they would be working. Upon arrival at each of the localities wherein the EAs were to be found, the teams further introduced themselves to the local leaders, again explaining the survey purpose. Local leaders were asked to help direct the teams towards the enumeration areas, which were often but not always tied to specific communities. Upon arrival at the community included in the EA, the teams met with the local *régulo*, or community representative, who confirmed the team's arrival at the appropriate EA and oriented the team, along with the available maps, on the EAs limits.

Data Collection and Management

The survey was administered face-to-face using cell phones in the majority of cases. In cases where this was not possible, the survey was administered face-to-face using a paper questionnaire and responses later entered into the cell phone. Because the key challenge in conducting surveys digitally is to protect the data in case of since hardware failure, our questionnaire was set up to be submitted securely via the GSM

wireless network. The interviewers and team leader were equipped with a mobile phone (HTC Tattoo) and each phone had a spare battery. Team leads were responsible for checking mobile phone battery charge and recharging batteries at the end of each day. Each team had access to both conventional wall chargers, as well as a car charger. Open Data Kit, an open source suite of tools that enables data collection on mobile phones and data submissions to a central server, was deployed with the development support of Dimagi for the survey (Dimagi, Inc., 2010). Since that mobile communications coverage in rural Zambézia is incomplete, cell phones were set up with enough memory to store dozens of completed surveys, and to send data as soon as the phone detected a signal. Nonetheless, as Mozambique experienced severe shortages of cell phone coverage services due to optic cable ruptures in months preceding survey implementation, a backup system was put into place for the transfer of data from cell phones to a central location in Maputo. In Maputo, the data was uploaded to the central server and checked for errors.

Sample Frame

According to the 2007 census (INE, 2007), the population for Zambézia is estimated at 3,794,489 living in 918,025 households which are divided into 9,073 enumeration areas (EAs). The Province of Zambézia is divided into 17 districts: Cidade de Quelimane (population: 193,343), Alto Molócuè (271,650), Chinde (119,898), Gilè (169,285), Gurué (297,935), Ile (289,542), Inhassunge (91,196), Lugela (135,485), Maganja da Costa (276,881), Milange (498,635), Mocuba (300,628), Mopeia (115,291), Morrumbala (358,915), Namacurra (186,410), Namarroi (125,999), Nicoadala (231,850), and Pebansmallere (185,333). There are 155,202 urban households (1,458 EA) and 762,823 rural households (7,615 EA) in the province. We collected two representative samples. One sample of Zambézia province will allow for general estimates. A second concentrated sample in Alto Molócuè, Morrumbala, and Namacurra will allow for precise estimates and better precision of the difference from baseline to the five years following SCIP–Ogumaniha project start-up. These three districts make up approximately 20% of the provincial population.

Sampling Methodology

Sampling was conducted by the Chief Sampling Statistician from the National Statistics Institute (INE) using the Government of Mozambique sampling frame created for use on all national surveys based on 2007 census results. The random sampling was performed in four steps. First, the sampling frame was stratified into urban and rural areas. Next, enumeration areas (EAs) were sampled for each stratum using probability proportional to size (PPS). Households within EAs were selected using simple random sampling or convenience sampling (when no aerial satellite images are available). In enumeration areas where anthropometric measurements were conducted, with households with one or more children aged 0-12 months, one child was randomly selected for weight and height measurements. Similarly, for households with one or more children aged 13-59 months, one child was randomly selected for weight and height measurements.

Step 1: Urban/ Rural/3 District Strata

According to FGH specifications, the sampling of EAs was done by the Chief Sampling Statistician and the National Institute for Statistics (INE) using the sampling frame of the 2007 census.

The EAs from the master sample frame were split into four groups: urban, rural, and a concentrated 3 district sample divided into no or any planned interventions. To capture SCIP–Ogumaniha partner activity well without increasing the sample size and survey costs, FGH over-sampled within 3 districts by planned interventions at the village level; Alto Molócuè, Morrumbala, and Namacurra were selected because they represent 3 distinct geographical regions and SCIP–Ogumaniha interventions will occur in each. A design weight was constructed to compensate for the oversampling of 3 districts to generate provincially representative figures.

Step 2: PPS Sampling of Enumeration Areas

EAs were sampled with replacement from strata using probability proportional to size. EAs with a higher number of households had a proportionally greater probability of selection than those with fewer households.

Step 3: Sampling of Households

Instead of household listings in field to update the sampling frame and map households, a novel technique was applied for this rural environment. Aerial satellite images were acquired from eMap (eMap International, 2010). An algorithm developed by a project engineer detects rooftops of households using color thresholds from the photos (Appendix 1). Houses are marked and randomly sampled with equal probability. Teams were given maps of the EAs marked with major roads and waterways. In the event that the building identified is uninhabited, not residential or nonexistent, enumerators were instructed to proceed to the next closest dwelling.

In cases when aerial photography was not available or inadequate, topographic maps from the National Institute of Statistics (*Instituto Nacional de Estatística*, INE) created for enumeration for national census were used, and a "spin the bottle" method adopted. To improve upon the quality of the sampling, a four-quadrant approach was used. The method works as follows:

- Divide the EA into quadrants.
- Choose a central point within each quadrant of the EA;
- Spin a bottle (or ink pen) to select a direction in which to proceed;
- Choose the first household in this direction as the starting point and then select the four nearest households.

Prior research simulating vaccination coverage by Lemeshow et al. (1985) indicates that the "spin the bottle" method is not ideal when there are pockets of vaccinated individuals; by introducing the four quadrants, we hope that some diversity is captured and the sample will remain acceptably representative of all EA households.

Step 4: Simple Random Sampling of Children

In EAs where anthropometric measures were to be carried out, children ages 0-59 months were selected from participating households. Due to time constraints, we were not able to implement programming that would randomly select two children from all children aged 0-59 months. Instead a table was prepared by the project statistician listing randomly generated numbers for households with two to eleven children aged 0-12 or 13-59 months; the team lead sampled and measured up to one child 0-12 months and up to one child 13-59 months, selected based on this random number and corresponding birth order.

Sample Size

To measure the effectiveness of SCIP–Ogumaniha activities while giving consideration to cost of administering the survey, we implemented a two-stage cluster sampling design. We determined the number of EAs to be selected and the number of individuals to be interviewed in each EA in order to achieve the desired precision within the survey budget (Aliago and Ruilin, 2006). The desired level of accuracy for the survey was set to a confidence level of 95%. For a confidence interval of ±5% we needed $s = 0.025$. The population proportion was set conservatively to $p = 0.5$ which maximizes the standard error (Levy and Lemeshow, 2008). The number of households interviewed per EA is set at $\bar{n} = 15$; this decision was motivated by the number of enumerators and a one day per EA workload. The number of clusters ($\bar{m}$) sampled was determined by the following equation (Bennet et al., 1991):

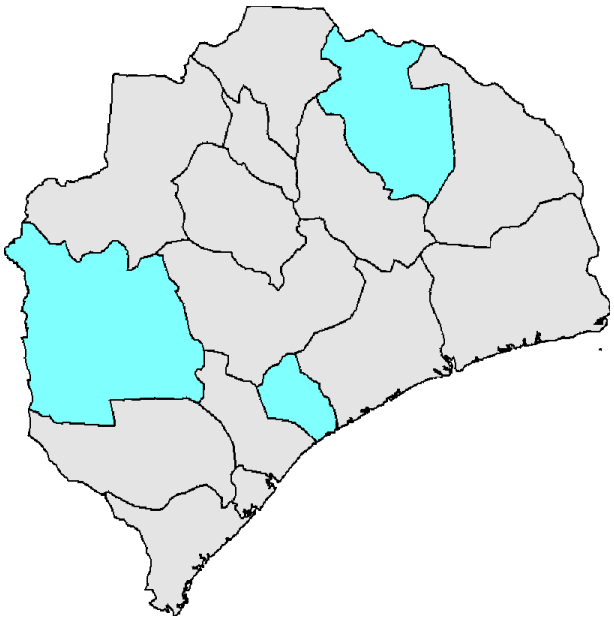
$$\bar{m} = \frac{p(1-p)D}{s^2\bar{n}} \tag{1}$$

Where D is the design effect, which quantifies the increase in the standard error of the estimate due to the sampling procedure used (Cochran, 1977; Bennet et al., 1991). The design effect increases with the number of interviews sampled within a cluster and decreases for small intracluster correlation (ICC), $D = 1 + ICC(\bar{n} - 1)$. Empirical data from previous DHS surveys suggested that high ICC occurs when measuring healthcare access, so we set $ICC = 0.15$; the design effect was slightly larger than 3.

The total sample size required was 3960 households.

Alto Molócuè, Morrumbala, and Namacurra

The enumeration areas of three Zambézian districts were first divided into two intervention levels (0, 1 or more). Each intervention level had 103 EA sampled with 15 interviews each. The sample size was calculated to achieve a precision of 4.5% in each of the two strata



Probabilistic selection criteria was used throughout the 3 district sample, except at the level of the household, when random sampling was used. To ensure a representative sample of households with access to health care, we used implicit stratification during selection of EA. Provincial districts have an average of 7 health centers and health posts and another 7 community posts (Lindelow et al., 2004). There are, however, differences across districts in the number of community posts, with some districts having many posts and many districts having none. Ministry of Health health centers are known to be located in the center (*Sede*, first locality) of each Administrative Post at a minimum. This *Sede* stratification is used instead of the more traditional urban/rural strata. Because the great majority of the population in Zambézia lives in rural areas, and because access to health care and other services is a key factor in the SCIP–Ogumaniha project, our sample contains approximately 30% of these areas with known health centers. Implicit selection and probability proportional to size sampling involves five steps: 1) order the list of EA (sample frame) by strata (here: district then locality), 2) create a cumulative count of households for the sample frame 3) determine a sampling interval by dividing the total number of households in the frame by the desired number of EA to sample, 4) select a random number between 1 and the sampling interval as a random start and select the EA with the corresponding cumulative household count, 5) then proceed to select EAs with replacement by adding the sampling interval to the start and selecting the EA containing the cumulative household count until the desired number of EA have been identified.

Zambézia-wide

To maintain a degree of generalizability across the province, a sample of households were selected for interview throughout the remaining 14 districts. Because 20% of the population is well represented in our concentrated sample of 3 districts (above), we needed fewer households from the remaining 80% of Zambézia. For the remaining 14 districts, we sampled 58 EA with 15 interviews each for a total of 870 households.

Sample size is based on having 15 interviews per EA and yields slightly better than 5% precision.

Probabilistic selection criteria was used throughout the Zambézia-wide sample, except at the level of the household, when random sampling was used. In order to first provide a summary of Zambézia-wide estimates with reasonable baseline precision (=6.5%), a random selection of 10 EA (with 15 interviews each) from the 3 district allocation were first collected in addition to the 58 EA from the Zambézia-wide allocation as 'phase I'. Phase I and II data have been combined to use all available survey data.

Child Anthropometrics

To determine the number of children 0-59 months needed for anthropometrics, we needed to select a minimum detectable difference. A 2008 survey from USAID indicated that median Z-scores fell between -1 and -1.99 for H/A and W/A and above -1 for W/H among eight Zambézian districts in the MYAP program. This same survey found that 77% of Zambézian households had one or more children aged 0-59 months. Because very few children fall outside of normal range for W/H in Zambézia, we will only focus on improvements in H/A and W/A. We assumed equal variance from baseline to five year sample. We wanted to be able to reject the null hypothesis that the anthropometrics are unchanged from baseline to 5 years with probability (power) 0.90 and have the Type I error probability associated with our test of this null hypothesis equal to 0.05 (Levy and Lemeshow, 2008).

$$N = \frac{(1 + ICC(\bar{n} - 1))(Z_\alpha + Z_\beta)^2(2\sigma^2)}{(\bar{X}_2 - \bar{X}_1)^2} \tag{2}$$

Note, the anthropometrics design effect is smaller than the overall survey design effect because previous DHS surveys indicate low intracluster correlation for child anthropometrics, $ICC = 0.07$ (Aliago and Ruilin, 2006). To detect an improvement in mean z-score for H/A from -1.8 to -1.4, we will need to measure a minimum of 482 children 0-59 months with 10 HH per EA. To detect an improvement in mean z-score for W/A from -1.25 to -1 we will need to measure a minimum of 941 children 0-59 months with 10 HH per EA.

If we rely on the prior USAID survey and expect 70% of Zambézian households to have at least one child 0-59 months, then we plan to measure children as follows:

[1] 3 districts: 37 EA will yield approximately 10 HH with a child 0-12 or 13-59 months.

[2] Zambézia-wide: All 58 EA will yield approximately 10 HH with a child 0-12 or 13-59 months.

In total, a minimum of 950 HH with children under five should be considered for anthropometrics.

Potential Sources of Error

Quality of household survey results in resource-limited settings is limited to the clarity of survey instrument, execution of good sample selection, minimal non-response, and effective interviews. Every effort was taken to reduce sources for error and bias in the allotted time frame; however, it is important to acknowledge potential downfalls while interpreting survey results.

The survey was developed in English and then translated to Portuguese by a native speaker from Brazil. In country, the Brazilian Portuguese version had to be modified to fit grammar and vocabulary more commonly used in Mozambique. From the revised Portuguese survey, revisions to improve clarity and localization occurred; five local language translations used this version. It is possible that questions remained that: 1) did not fit well with the local context, 2) were not easily understood or not fully adapted to the local context, and/or 3) were incorrectly translated. The survey was programmed for electronic data capture to minimize data entry errors during the transfer of data from paper to electronic form. However, low levels of familiarity with the mobile phone technology could have created new sources of error, particularly if incorrect values were entered. The lack of hard copies of completed surveys limited our ability to

clean data where discrepancies appeared.

While INE supplied the sampling weights and ArcGIS shape files for each EA, they did not provide household listings from the 2007 census. To ensure a representative sample, it is important that households are selected at random and with equal probability within the EAs. For some EAs, we were unable to obtain aerial satellite images and the "spin the bottle" technique was used. This technique can lead to bias when selecting only the village center; we attempted to reduce this bias through selection in four quadrants, because neighboring dwellings share similar characteristics (higher intracluster correlation). This technique may also produce a greater design effect than the original sample size calculation. Additionally, the accuracy of our algorithm-based household detection was only tested on training data and not the rural setting of Zambézia. For areas with no maps, the location of the EAs was further limited by our ability to properly locate their geographic coordinates.

When a head of household refused to participate in the survey, this is a case of non-response. The data may not be considered missing at random; every effort was made to minimize and then summarize non-response. Enumerators were prepared for situations of non-response and they were instructed on how to pursue an interview at the selected household with persistence, but not coercion. Another form of non-response is refusal to answer particular survey questions which might have been sensitive in nature. To distinguish between missing data versus refusal to respond, we had two categories for no response: DK (does not know) and No Response (does not answer). Additionally, the field testing to assess appropriateness of questions to the local context removed questions that may be overly sensitive in nature.

Extensive training on administering the questionnaires and using electronic data entry took place in 3 districts. Survey team leads were responsible for monitoring the location and administration of interviews. Use of local language translations were heavily dependent on the enumerator's reading ability, and on the appropriate literacy level of the translated versions.

Results

1 Data Collection and Survey Response

Data collection was carried out between 8 August and 25 September, 2010. There were 928 surveys completed in 66 of the 68 Phase I of data collection across 14 districts in Zambézia. For Phase II, a total of 2821 surveys were completed in 193 enumeration areas. While we had hoped to collect data for all Phase I areas first, and then proceed into the EAs for Phase II, logistic constraints including road navigability forced us to modify the data collection schedule slightly. We completed those Phase I areas first whenever feasible, collecting data from Phase II areas only in those cases where the Phase I areas were not accessible, in order to maximize the efficiency of data collection in the field and to not leave data collectors idle. The table below captures the total numbers of EAs completed, households surveyed, and children measured in each of the survey phases. Only two enumeration areas in the entire survey were not completed. One enumeration area was 35 kilometers from the nearest road, with the main bridge out of service and the only alternate mode of transportation available, upon crossing the makeshift temporary bridge, was by bicycle. The second EA could not be identified based on information provided by INE, and no maps were available.

Table 1: Survey Collection

	Total EAs			Total Households			Child Anthropometrics		
Phase	Planned	Completed	Databased	Planned	Completed	Databased	Planned	Completed	Databased
Phase I	68	66	66	1020	989	928	680	1012	449
Phase II	196	196	193	2940	2927	2821	270	365	218
Zambézia-wide	264	262	259	3960	3916	3749	950	1377	667

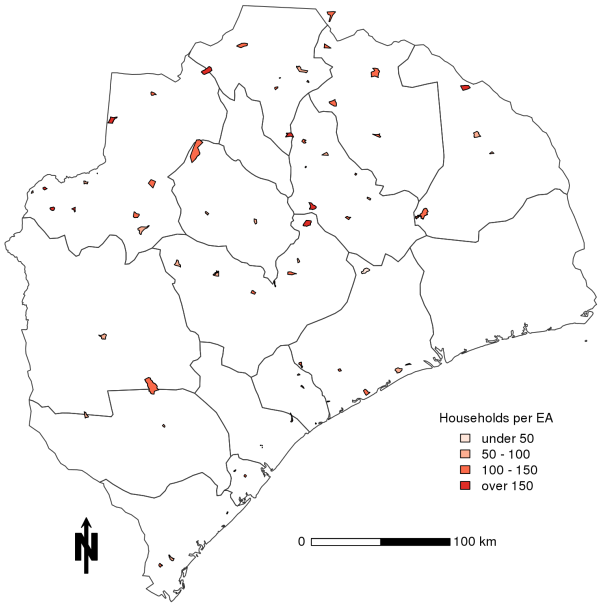
Satellite maps of the enumeration areas were only found to be useful in the three EAs surveyed in the city of Quelimane, where landmarks were easily identifiable and homes not too disperse. Of the remaining 65 EAs in Phase I, 58 had topographic maps from the National Institute of Statistics available, which were used, were useful to help delineate the EAs, with the help of the local community leaders. For the 7 EAs in Phase I where no maps were available, several additional steps were taken by the teams to localize themselves and randomly select households for survey participation.

- During the introduction of the survey to the District Administrator, survey teams asked for copies of any maps or graphical representations of areas that could help in the identification of the area selected for data collection
- Details of the descriptive names of the EAs were used to help narrow down the location: district, administrative post, locality, population area (*povoado*), and village
- Upon arrival at the locality of the EA selected, local leaders were asked whether any graphical information, including community maps, were available for the area of interest
- Once the team arrived in the population area and/or village, the team requested the *régulo* to accompany the team to the area, in order to identify the area and its borders. Points of reference, such as roads, rivers, schools and others that could help identify the area to be covered.

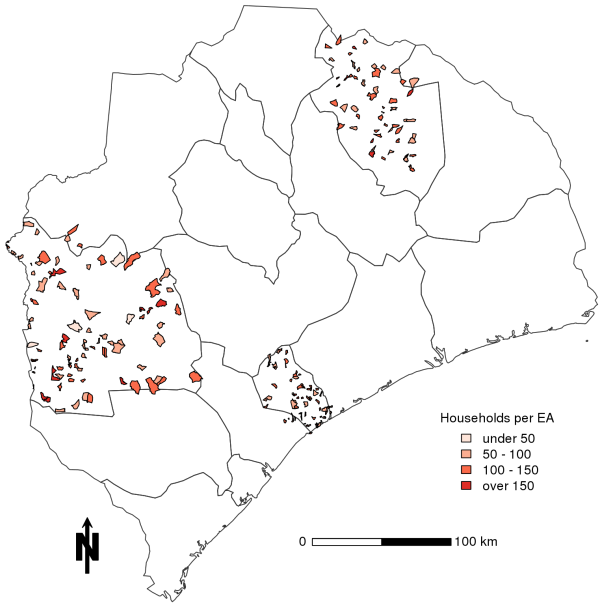
Following the identification of the EA borders, the team divided the area into four quadrants. Starting in one quadrant, the team would split up, and then followed the protocols for household selection where only topographic maps were available.

There are 3749 Zambézia-wide surveys completed in 259 EA and 14 districts with a median interview time of 73 minutes. Zambézia-wide survey interviews were conducted during 49 days yielding approximately 77 interviews per day. Participation rate was 99.7%, very few surveys were not completed, and only one household was dropped because no one was at home after two visits by the interviewer. See table 2.

Figure 1: Selected Enumeration Areas



(a) Phase I Sample Coverage



(b) 3 District Sample Coverage

Table 2: Survey Response

	Zambézia-wide
Household Located, n(%)	
House location confirmed	3749 (100.0%)
Survey Completion Status, n(%)	
Participant quits	1 (<0.1%)
Other, survey incomplete	10 (0.3%)
Safety concern at location	2 (0.1%)
Length of interview (minutes)[a]	72.7 (49.6, 111.7)

[a] Continuous variables are reported as medians (interquartile range).

Table 3: Survey Response by District

District	Number of EAs	Number of Interviews	Length of Interview[a] (minutes)
Alto Molocue	51	815	59.7 (44.6, 81.5)
Chinde	3	43	124.6 (68.1, 1286)
Gile	4	58	94.6 (70.7, 110.3)
Gurue	7	106	78.7 (61, 102.4)
Ile	6	68	92.4 (74.2, 118.2)
Inhassunge	2	30	121.7 (96.8, 310.8)
Lugela	4	55	83.5 (74.6, 107)
Maganja da Costa	7	113	80.6 (57.7, 129.5)
Milange	12	179	92.9 (69.6, 121.4)
Mocuba	7	92	117.8 (80.8, 146.5)
Mopeia	2	26	70.8 (48.6, 1458)
Morrumbala	93	1295	55.6 (39.2, 91.6)
Namacurra	58	824	90.4 (69.5, 125)
Quelimane	3	45	118.1 (93.9, 224.8)
Zambézia-wide	259	3749	72.7 (49.6, 111.7)

[a] Continuous variables are reported as medians (interquartile range).

This report covers the analysis of general estimates of the Ogumaniha project indicators. It is based on the data collected during phases I and II based on a sample representative of all Zambézia households.

2 Demographics

Tables 4 and 5 gives summary demographic information of the female respondent and household. The median age (interquartile range, IQR) of survey respondents was 29 (23, 37), ranging in age from 16 to 90 years. Most (53.0%) were officially married or in a common law relationship (20.1%). The years of formal education was low, with a median (IQR) 2 (0, 4) years of completed education, and a range of 0 to 15 years. A majority felt they were not fluent in Portuguese (59.9%).

Table 4: Basic Demographics: Female Head of Household

	Zambézia-wide
Age[a] (n=3210)	29 (23, 37)
Marital Status[b] (n=3749)	
Common Law	20.1%
Divorced/Separated	3.4%
Married	53.0%
Single	18.8%
Widowed	4.6%
No response	0.1%
Education (years)[a] (n=3749)	2 (0, 4)
Fluent in Portuguese[b] (n=3749)	
No	59.9%
Yes	38.3%
No response	1.7%

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.

The median (IQR) household size was 5 (3, 6) members, ranging in size from 1 to 17. Surveys were conducted in Elomwe, Echuabo, Portuguese, Cinyanja, and Cisena, in order of volume. There was a small proportion of Makhuwa households (1.5%) that were interviewed in other languages they spoke, and a sizable proportion of 'other' reported ethnicities (16.4%). Three quarters of households had at least one child under the age of five, but some as many as 8. By comparison the results of the Multiple Indicator Survey found that 54% of households in Zambézia had at least one child under 5 years of age (MICS, 2008). Most households self-identified their religion as Catholic (43.2%), although there were various other religions. The median (IQR) length of residency in the current location was 5 (3, 12) years. See table 5.

Table 5: Basic Demographics: Household

	Zambézia-wide
Household size[a] (n=3749)	5 (3, 6)
Language of survey[b] (n=3749)	
Portuguese	15.8%
Cinyanja	12.9%
Cisena	9.8%
Echuabo	20.5%
Elomwe	40.9%
Emahkuwa	0.0%
No response	0.1%
Language of household[b] (n=3749)	
Portuguese	8.8%
Cinyanja	13.1%
Cisena	10.8%
Cisenga	0.0%
Echuabo	22.1%
Elomwe	44.3%
Emakhuwa	0.4%
Xironga	0.0%
Xitswa	0.1%
No response	0.4%
Ethnic group identity (n=3749):[c]	
Elomwe	38.5%
Echuabo	30.4%
Ciesena	10.6%
Cinyanja	11.5%
Emakhuwa	1.5%
Other	16.4%
Children under age 5[a] (n=3749)	1 (1, 2)
Any child under age 5	75.1%
Religion[b] (n=3749)	
Agnostic or atheist	1.3%
Catholic	43.2%
Islam Muslim	8.8%
Jehovah's Witness	2.4%
LDS Mormon	1.9%
Protestant	12.1%
Evangelical and Pentecostal	15.7%
Traditional Religions	1.2%
Non Christian Eastern	2.3%
Spiritual (no specific denomination)	6.5%
No response	3.4%
Do not know	1.3%
Length of residency (years)[a] (n=3649)	5 (3, 12)
Roofing material (largest dwelling)[b] (n=3749)	
Aluminum	0.1%
Cement	0.3%
Grass/Cane/Leaves/Straw	82.5%
Tile	0.4%
Zinc	15.0%
No response	1.7%

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.
[c] Percentages may sum to greater than 100%.

Table 6 summarizes past assistance received by any household. The vast majority of households interviewed did not report receiving any assistance from Ogumaniha partners or from prior USAID-funded

projects. While 18.4% of households reported having orphans, very few reported ever receiving any assistance from OVC programs; of households specifically reporting having at least one orphan residing with them, only 3.3% percent ever received assistance through OVC activities, but 4.0% of the total households reported ever receiving OVC assistance. It is possible that OVC assistance was provided to households without any OVC, or that some households had OVC residing at one point but not at the time of the survey..

Table 6: Past Assistance to Household

	Zambézia-wide
Received ANY assistance from:	
OVC[b] (n=3749)	
No	93.3%
Yes	4.0%
Do not know	2.5%
No response	0.2%
ADRA[b] (n=3749)	
No	93.2%
Yes	2.7%
Do not know	3.8%
No response	0.3%
COACH[b] (n=3749)	
No	94.8%
Yes	1.2%
Do not know	3.7%
No response	0.4%
RITA[b] (n=3749)	
No	92.9%
Yes	2.9%
Do not know	3.4%
No response	0.8%
MozARK[b] (n=3749)	
No	93.9%
Yes	1.2%
Do not know	4.5%
No response	0.4%
OCLUVELA[b] (n=3749)	
No	93.9%
Yes	1.2%
Do not know	4.0%
No response	0.9%
OGUMANIHA[b] (n=3749)	
No	93.8%
Yes	1.5%
Do not know	4.0%
No response	0.7%
Household has orphans[b] (n=3749)	
No	81.4%
Yes	18.4%
Do not know	0.0%
No response	0.1%
Household with orphans receive assistance[b] (n=703)	
No	96.1%
Yes	3.3%
Do not know	0.0%
No response	0.6%

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.

3 Objective 1: Increase access, quality and use of community and facility-based services

Table 7 to 9 give summary information on antenatal care, pregnancy and delivery. Tables 10 and 12 summarize data related to contraception. Tables 14–21 provide data on child health for households with children aged 0-59 months. Tables 14–17 give information on the immunization of children according to schedules for children at 1 month, under 4 months, 12 to 23 months, and 13 to 59 months of age. Tables 18–20 show measures of child health for all children aged 0-59 months, children aged 0-12 months and children aged 13-59 months. Table 21 demonstrates the caregiver health-seeking practices and knowledge in households with children under age 5. Table 22 gives summary information on malaria incidence and prevention. Tables 23 and 24 summarize information on HIV-related health services and on HIV knowledge. Table 25 examines health care utilization and satisfaction.

3.1 Antenatal care, pregnancy and delivery

Of those interviewees who have had a child, a majority (59.1%) had visited a health facility for antenatal care at some point during their last pregnancy. Among them, 8.7% had visited a health facility once, 12.4% twice, 22.5% three times, 16.3% four times, and 39.7% five or more times. Of those who had visited a health facility, 89.0% reported having received good treatment by the clinic staff. Over ninety (92.5%) percent of women who had visited a health facility for antenatal care during their last pregnancy delivered their baby at a health facility, with 83.7% of them reporting having received good care at delivery. Of those who delivered at a health facility, 86.2% reported they would return for care and delivery during their next pregnancy. Among all women with live births in the last 5 years, 57.9% (Zambézia) and 84% (nationally) had at least one antenatal care visit (DHS, 2003), which indicates no increase in this indicator since 2003. See table 7.

Of those interviewees who have had a child, 14.0% received the full package of antenatal services, including fansidar, tetanus toxoid, vitamin A (post-partum), iron, a bednet, and CT. Of those who had visited a health facility, this proportion of women who received the full package of antenatal services increases to 22.9%.

Table 7: Antenatal Care

	Zambézia	95% CI
Visited a health facility for antenatal care during last pregnancy[b] (n=3259)		
No	36.6%	(31.6, 41.6)
Yes	59.1%	(53.9, 64.4)
Do not know	2.2%	(1.2, 3.3)
No response	2.0%	(1.0, 3.0)
Among women who visited a health facility during last pregnancy (n=1551):		
Number of health facility visits for antenatal care[b] (n=1486)		
1	8.7%	(6.3, 11.1)
2	12.4%	(9.7, 15.1)
3	22.5%	(18.1, 26.8)
4	16.3%	(12.7, 19.9)
5 or more	39.7%	(33.9, 45.5)
No response	0.5%	(0.0, 1.0)
Received good treatment for antenatal care at health facility[b] (n=1551)		
No	6.1%	(4.0, 8.2)
Yes	89.0%	(86.1, 91.9)
Do not know	1.0%	(0.1, 1.9)
No response	3.9%	(1.9, 5.8)
Delivery performed in a health facility[b] (n=1551)		
No	7.5%	(4.8, 10.3)
Yes	92.5%	(89.7, 95.2)
Received good treatment for last delivery performed in a health facility[b] (n=1551)		
No	8.8%	(6.3, 11.2)
Yes	83.7%	(79.9, 87.5)
Do not know	1.1%	(0.3, 1.9)
No response	6.5%	(4.1, 8.8)
Willing to return to health facility for next birth[b] (n=1551)		
No	6.7%	(4.1, 9.3)
Yes	86.2%	(82.6, 89.9)
Do not know	4.4%	(2.5, 6.4)
No response	2.7%	(1.2, 4.1)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 8: Services Received During Antenatal Care

	Zambézia	95% CI
Received iron supplements during last pregnancy[b] (n=3259)		
No	38.4%	(33.2, 43.5)
Yes	56.2%	(50.7, 61.8)
Do not know	2.3%	(1.3, 3.3)
No response	3.1%	(1.8, 4.5)
Received vitamin A within 2 months post-partum[b] (n=3259)		
No	44.6%	(40.0, 49.2)
Yes	50.5%	(45.7, 55.3)
Do not know	2.4%	(1.1, 3.7)
No response	2.5%	(1.3, 3.7)
Vaccinated with tetanus toxoid during last pregnancy[b] (n=3259)		
No	32.7%	(28.1, 37.2)
Yes	62.1%	(57.1, 67.2)
Do not know	2.3%	(1.3, 3.4)
No response	2.8%	(1.7, 4.0)
Number of times injected with tetanus toxoid during last pregnancy[b] (n=1832)		
Once	33.0%	(29.0, 37.1)
Twice	36.0%	(31.9, 40.0)
More than twice	26.8%	(22.8, 30.8)
Do not know	3.3%	(1.5, 5.0)
No response	0.9%	(0.1, 1.8)
Received any fansidar during last pregnancy[b] (n=3259)		
No	48.4%	(43.5, 53.3)
Yes	47.4%	(42.1, 52.7)
Do not know	1.8%	(1.0, 2.5)
No response	2.4%	(1.4, 3.5)
Received a mosquito net during last pregnancy[b] (n=3259)		
No	63.9%	(59.5, 68.3)
Yes	32.5%	(27.9, 37.0)
Do not know	1.0%	(0.4, 1.5)
No response	2.7%	(1.5, 3.9)
Offered CT during last pregnancy[b] (n=3259)		
No	67.0%	(62.5, 71.5)
Yes	28.9%	(24.2, 33.6)
Do not know	2.8%	(1.7, 3.8)
No response	1.3%	(0.6, 2.1)
Received full package of antenatal services (n=3259)	14.0%	(10.1, 17.8)
Among women who visited a health facility during last pregnancy (n=1551):		
Received any fansidar during last pregnancy	67.4%	(61.9, 73.0)
Vaccinated with tetanus toxoid during last pregnancy	81.7%	(76.9, 86.5)
Received iron supplements during last pregnancy	76.8%	(71.9, 81.6)
Received vitamin A within 2 months post-partum	68.2%	(62.5, 73.9)
Received a mosquito net during last pregnancy	47.7%	(42.0, 53.4)
Offered CT during last pregnancy	40.9%	(34.8, 47.0)
Received full package of antenatal services	22.9%	(17.3, 28.5)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Regarding antenatal and delivery services, 62.1% of all eligible women were vaccinated against tetanus during their last pregnancy, which is very close to the figures reporting having visited a health facility. Of those vaccinated, 36.0% were vaccinated twice, and 26.8% were vaccinated more than twice, indicating good coverage for anti-tetanus vaccine. During their last pregnancy, 56.2% of all women received iron supplements, 47.4% received any fansidar, 32.5% received a mosquito net, and 50.5% received vitamin A supplements,. According to the DHS (2003), of all women with live births in the last 5 years, 75.7% (nationally) and 54.1% (in Zambézia) received at least one tetanus vaccination dose. This indicates a modest increase in tetanus vaccine rates in Zambézia since 2003. A quarter (28.9%) of respondents were offered

HIV counseling and testing during their last pregnancy. Almost eight percent (9.0%) of the respondents were pregnant at the time of the survey, and 58.6% of these had visited a health facility for antenatal care. See table 8.

Among those who ever breastfed their youngest child, nearly all women breastfed the child on the day of their birth with 72.5% immediately following birth, and 89.7% of those who breastfed actually gave the baby the first mother's milk. By comparison, in the 2008 MICS report, 85.2% of Zambézian mothers breastfed their baby within the first day and 62.3% within the first hour (MICS, 2008). Interestingly, the median (IQR) length of time the child was breastfed is 4 (3, 6) months, and mothers reported introducing solid foods in the baby's diet at a median (IQR) of 6 (4, 6) months.

Table 9: Pregnancy and Breastfeeding

	Zambézia	95% CI
Currently pregnant[b] (n=3749)		
No	83.4%	(80.6, 86.1)
Yes	9.0%	(7.2, 10.8)
Do not know	1.3%	(0.6, 2.0)
No response	6.4%	(4.4, 8.4)
If pregnant, visited a health facility for antenatal care[b] (n=352)		
No	37.7%	(25.9, 49.5)
Yes	58.6%	(45.3, 71.9)
Do not know	3.5%	(0.0, 7.7)
No response	0.3%	(0.0, 0.5)
If pregnant, sleeps under bednet[b] (n=352)		
No	48.7%	(36.9, 60.5)
Yes	49.8%	(38.2, 61.5)
Do not know	1.2%	(0.0, 3.2)
No response	0.3%	(0.1, 0.6)
Ever breastfed youngest child[b] (n=3259)		
No	8.4%	(6.7, 10.2)
Yes, already	42.7%	(38.9, 46.5)
Yes, continue	45.5%	(41.3, 49.7)
Do not know	1.0%	(0.0, 2.1)
No response	2.3%	(1.3, 3.3)
Among women who breastfed:		
Ever breastfed youngest child[b] (n=2688)		
Immediately	72.5%	(68.8, 76.3)
Later on the day of birth	24.9%	(21.4, 28.5)
In first week	2.0%	(1.0, 3.0)
Do not know	0.2%	(0.0, 0.6)
No response	0.3%	(0.0, 0.6)
First mother's milk given to baby[b] (n=2688)		
No	9.5%	(6.6, 12.5)
Yes	89.7%	(86.9, 92.6)
Do not know	0.3%	(0.0, 0.8)
No response	0.4%	(0.0, 0.8)
Length of breastfeeding (months)[a] (n=2674)	4 (3, 6)	
Child age at inclusion of other food (months)[a] (n=2647)	6 (4, 6)	

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

3.2 Reproduction intent

A majority of women interviewed (53.4%) reported no desire to limit or space births; approximately 30 percent of women interviewed expressed a desire to limit or space births. Among women not currently

pregnant, 44.8% percent reported that they would be unhappy should they find themselves pregnant in a short period. Close to three quarters of women had never used a form of contraception. The overall proportion of women reporting ever having used any method of modern contraception was 22.3%.

Table 10: Reproduction Intent

	Zambézia	95% CI
Desire to limit or space births[b] (n=3749)		
No	53.4%	(49.7, 57.1)
Yes	31.2%	(26.4, 36.0)
Do not know	8.4%	(6.3, 10.5)
No response	7.0%	(5.0, 9.1)
If not pregnant, feelings toward an immediate pregnancy[b] (n=3397)		
Unhappy	44.8%	(41.3, 48.3)
Would not matter much	8.6%	(6.6, 10.6)
Happy	33.5%	(30.3, 36.7)
Do not know	5.4%	(3.7, 7.0)
No response	7.8%	(5.5, 10.1)
Ever used any method to delay or avoid pregnancy[b] (n=3749)		
No	75.1%	(71.4, 78.8)
Yes	22.3%	(18.5, 26.2)
Do not know	1.7%	(0.7, 2.6)
No response	0.9%	(0.1, 1.7)
Currently using ANY modern contraceptive (n=3749)	13.4%	(10.3, 16.6)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

3.3 Contraception

Of all women interviewed, 13.4% reported currently using any modern contraceptive method. Of the women who had ever used any method, 40.2% reported currently using any modern contraceptive. The most commonly used modern methods among women reporting current use were: contraceptive injections (34.0%), natural (traditional) method (18.2%) and contraceptive pill (18.9%). Current usage of condom (9.3%), rhythm method (7.7%), and female condom (3.3%) were low. Prevalence of current use for other methods such as IUD (3.1%), sterilization (1.0%), and coitus interruptus (5.0%) were very low.

Contraception prevalence among women surveyed in this population are quite low. There appears to be little, if any, increase in the utilization of contraceptives among Zambézian women between 2003 and 2010. The Mozambique Demographic and Health Survey of 2003 reports that the national rate of use of any modern contraceptive was 18.2%, whereas that of Zambézia was 11%; this is in agreement with the proportion in the current survey (DHS, 2003). The rates of current contraceptive use in Zambézia, among women married or living in common union were reported in the DHS 2003 as follows: 4.8% contraceptive injection, 3.5% contraceptive pill, 0.9% sterilization, 0% IUD, 0% condom (DHS, 2003). See tables 11–12.

Table 11: Contraception Prevalence

	CURRENT		PAST	
	Zambézia	95% CI	Zambézia	95% CI
Among all female respondents (n=3749):				
Currently using ANY modern contraceptive	13.4%	(10.3, 16.6)		
Use natural (traditional) method	4.1%	(2.5, 5.7)	4.8%	(3.0, 6.5)
Use condom	2.1%	(1.0, 3.2)	3.8%	(1.8, 5.8)
Use contraceptive pill	4.4%	(2.9, 5.8)	9.0%	(6.2, 11.7)
Use IUD	0.7%	(0.1, 1.3)	0.6%	(0.0, 1.2)
Use coitus interruptus	1.2%	(0.4, 2.0)	1.8%	(0.9, 2.7)
Use contraceptive injection	7.9%	(5.7, 10.0)	9.9%	(7.2, 12.5)
Use rhythm method	1.9%	(0.8, 3.1)	3.9%	(2.4, 5.3)
Use female condom	0.8%	(0.3, 1.4)	0.9%	(0.3, 1.5)
Sterilization	0.2%	(0.0, 0.5)		

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 12: Contraception Use

	CURRENT		PAST	
	Zambézia	95% CI	Zambézia	95% CI
Among women who have tried to delay or avoid pregnancy (n=701):				
Currently using ANY modern contraceptive[b]				
No	40.2%	(33.1, 47.3)		
Yes	57.9%	(50.4, 65.3)		
No response	1.9%	(0.5, 3.4)		
Use natural (traditional) method[b]				
No	79.9%	(73.8, 86.0)	76.9%	(70.6, 83.2)
Yes	18.2%	(12.2, 24.2)	21.2%	(14.9, 27.5)
No response	1.9%	(0.5, 3.4)	1.9%	(0.5, 3.4)
Use condom[b]				
No	84.5%	(79.1, 89.9)	78.7%	(71.7, 85.8)
Yes	9.3%	(4.8, 13.9)	16.3%	(9.0, 23.7)
Do not know	4.2%	(0.4, 8.1)	3.0%	(0.4, 5.7)
No response	1.9%	(0.5, 3.4)	1.9%	(0.5, 3.4)
Use contraceptive pill[b]				
No	78.6%	(73.6, 83.5)	58.2%	(49.9, 66.4)
Yes	18.9%	(14.1, 23.7)	38.9%	(30.6, 47.2)
Do not know	0.6%	(0.0, 1.7)	1.0%	(0.0, 2.3)
No response	1.9%	(0.5, 3.4)	1.9%	(0.5, 3.4)
Use IUD[b]				
No	86.4%	(81.1, 91.7)	85.8%	(80.2, 91.4)
Yes	3.1%	(0.5, 5.8)	2.7%	(0.1, 5.3)
Do not know	8.5%	(3.3, 13.7)	9.6%	(4.1, 15.1)
No response	1.9%	(0.5, 3.4)	1.9%	(0.5, 3.4)
Use coitus interruptus[b]				
No	86.2%	(80.9, 91.5)	83.0%	(77.9, 88.2)
Yes	5.0%	(1.5, 8.6)	8.1%	(4.3, 11.9)
Do not know	6.5%	(2.0, 11.0)	6.9%	(2.4, 11.3)
No response	2.3%	(0.7, 3.9)	2.0%	(0.5, 3.4)
Use contraceptive injection[b]				
No	62.2%	(55.9, 68.5)	53.7%	(46.1, 61.4)
Yes	34.0%	(27.3, 40.7)	42.1%	(34.0, 50.3)
Do not know	1.8%	(0.0, 3.7)	2.2%	(0.1, 4.3)
No response	2.0%	(0.5, 3.4)	1.9%	(0.5, 3.4)
Use rhythm method[b]				
No	86.2%	(80.6, 91.8)	78.3%	(72.5, 84.0)
Yes	7.7%	(3.3, 12.0)	16.3%	(11.1, 21.5)

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Table 12 – Contraception, *Continued*

	CURRENT		PAST	
	Zambézia	95% CI	Zambézia	95% CI
Do not know	3.4%	(0.5, 6.2)	2.7%	(0.1, 5.3)
No response	2.7%	(0.8, 4.7)	2.7%	(0.7, 4.7)
Use female condom[b]				
No	88.6%	(83.9, 93.3)	87.8%	(82.5, 93.0)
Yes	3.3%	(1.1, 5.5)	3.6%	(1.1, 6.1)
Do not know	5.4%	(1.1, 9.7)	5.8%	(1.5, 10.1)
No response	2.7%	(0.7, 4.7)	2.8%	(0.8, 4.8)
Sterilization[b]				
No	88.7%	(84.4, 93.0)		
Yes	1.0%	(0.0, 2.4)		
Do not know	8.2%	(4.0, 12.5)		
No response	2.1%	(0.6, 3.5)		

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

3.4 Vaccination coverage

Table 13 describes the vaccination schedule of children and mothers in Mozambique. At birth, children should receive TB (BCG) and the first dose of oral polio vaccine (OPV). By age 4 months they should have received the next three vaccination doses for Diptheria, Pertussis, Tetanus (DPT), Hepatitis B, and Polio (DPT+HepB+OPV). By age 9 months they should have also received the measles vaccine. Tables 14–17 describe vaccination rates for Zambézian children at four age groups, to assess how closely to schedule children are receiving vaccines.

Table 13: Vaccination Schedule in Mozambique

Vaccination for Infants[§]			**Women of child bearing age (15–49 years)**[§]		
Age	Visit	Antigen	Visit	Interval	Antigen
Birth	1	BCG, OPV0	1	0 (as early as possible)	TT1
6 weeks	2	DTP-HepB1, OPV1	2	4 weeks	TT2
10 weeks	3	DTP-HepB2, OPV2	3	6 weeks	TT3
14 weeks	4	DTP-HepB3, OPV3	4	1 year or subsequent pregnancy	TT4
9 months	5	Measles	5	1 year or subsequent pregnancy	TT5
6-59 months		Vitamin A Supplement		All post-natal mothers	Vitamin A Supplement

[§] Source: MOH, EPI unit (The Government of Mozambique Ministry of Health: Expanded Programme on Immunization) Comprehensive Multi-Year Plan (2007-2009).

Overall, 64.2% of children 0–59 months presented a vaccination card. For those without a vaccination card, we used the mother's report of vaccine coverage. Figures in table 14 show that 59.8% of children one month or younger had a vaccination card. Of those, 81.9% were up-to-date with vaccination having received both BCG and OPV. Of those children without a card, 24.5% reported receiving both BCG and OPV. Therefore, an estimated 58.8% of children up to one month of age were on schedule with vaccinations.

Table 14: Immunization of Children Aged 1 Month

	Zambézia-wide	95% CI
Head of household presents an immunization card (n=208)	59.8%	(48.4, 71.3)
BCG immunization record (n=124)		
Dose 1	94.9%	(90.1, 99.7)
Polio immunization record (n=124)		
Dose 1	84.5%	(74.7, 94.3)
Immunizations up-to-date (from card) (n=124)	81.9%	(71.7, 92.0)
No immunization card (n=208)	40.2%	(28.7, 51.6)
Reported vaccination (no card) (n=84)		
BCG	24.5%	(8.7, 40.2)
Polio	27.9%	(13.3, 42.5)
Immunizations up-to-date (no card) (n=84)	24.5%	(8.7, 40.2)
Overall estimate of up-to-date immunizations (n=208)	58.8%	(47.2, 70.4)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 15 summarizes vaccination coverage for children age 4 to 12 months old; 81.5% presented a vaccination card. Of those, only 31.2% were up-to-date in their vaccinations. Among those not presenting a vaccination card,26.3% reported having received BCG+polio+DPT+HepB. The estimated proportion of children 4-9 months old who are up-to-date with vaccines is 30.3%. Because we did not collect specific timing and number of doses among those reporting without a vaccine card, this may be result in overestimation of overall vaccination coverage.

Table 15: Immunization of Children Aged 4 to 9 Months

	Zambézia-wide	95% CI
Head of household presents an immunization card (n=140)	81.5%	(70.8, 92.1)
BCG immunization record (n=113)		
Dose 1	95.6%	(91.5, 99.8)
Polio immunization record (n=113)		
Dose 1	90.3%	(82.5, 98.1)
Dose 2	72.3%	(55.9, 88.8)
Dose 3	60.0%	(44.8, 75.3)
Dose 4	40.6%	(27.2, 54.0)
DPT+HepB immunization record (n=113)		
Dose 1	75.9%	(63.2, 88.6)
Dose 2	49.4%	(33.5, 65.4)
Dose 3	39.0%	(25.7, 52.4)
Immunizations up-to-date (from card) (n=113)	31.2%	(18.2, 44.2)
No immunization card (n=140)	18.5%	(7.9, 29.2)
Reported vaccination (no card) (n=27)		
BCG	45.5%	(27.6, 63.5)
Polio	36.5%	(16.7, 56.2)
DPT	30.8%	(14.5, 47.2)
HepB	26.3%	(8.0, 44.6)
Immunizations up-to-date (no card) (n=27)	26.3%	(8.0, 44.6)
Overall estimate of up-to-date immunizations (n=140)	30.3%	(18.9, 41.7)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 16 shows coverage for children 13-23 months, to enable comparisons with results from previous surveys such as DHS and MICS. In the 12–23 months age group, 76.2% of those interviewed were able to present a vaccination card for children in this age group. Of those presenting a card, 56.4% have documentation of being fully immunized (documented full series of antigen), and 28.8% has received at least one dose of vitamin A. Of those children without a vaccination card, 52.8% reported having received all the

different vaccines (BCG+Polio+DPT+HepB+Measles). The overall estimate of children 12–23 months old who are fully immunized is 55.5%.

3

Table 16: Immunization of Children Aged 12 to 23 Months

	Zambézia-wide	95% CI
Head of household presents an immunization card (n=123)	76.2%	(65.6, 86.9)
BCG immunization record (n=86)		
Dose 1	90.6%	(82.9, 98.4)
Polio immunization record (n=86)		
Dose 1	86.3%	(77.6, 95.0)
Dose 2	81.1%	(69.7, 92.6)
Dose 3	76.1%	(63.8, 88.5)
Dose 4	69.0%	(55.8, 82.2)
DPT+HepB immunization record (n=86)		
Dose 1	78.0%	(67.0, 88.9)
Dose 2	73.9%	(60.0, 87.8)
Dose 3	65.4%	(50.1, 80.7)
Measles immunization record (n=86)		
Dose 1	76.0%	(63.9, 88.1)
Fully immunized (from card) (n=86)	56.4%	(40.4, 72.3)
Vitamin A Dose (from card)[b] (n=86)		
No	28.8%	(16.6, 41.0)
Yes	71.1%	(58.9, 83.3)
Do not know	0.1%	(0.0, 0.2)
No immunization card (n=123)	23.8%	(13.1, 34.4)
Reported vaccination (no card) (n=37)		
BCG	66.1%	(42.9, 89.3)
Polio	62.9%	(39.3, 86.4)
DPT	62.7%	(39.1, 86.3)
HepB	52.9%	(33.1, 72.8)
Measles	59.2%	(34.7, 83.8)
Estimate of fully immunized without card (BCG+Polio+DPT+HepB+Measles) (n=37)	52.8%	(32.9, 72.6)
Overall estimate of fully immunized (n=123)	55.5%	(42.9, 68.1)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 17 shows vaccination coverage estimates for children 13 to 59 months of age; at this point, all scheduled vaccination series should be complete. In this age group, 57.8% of those interviewed were able to present a vaccination card for children in this age group. Of those presenting a card, 66.9% have documentation of being fully immunized (documented full series of antigen), and 27.1% has received at least one dose of vitamin A. Of those children without a vaccination card, 48.5% reported having received all the different vaccines (BCG+Polio+DPT+HepB+Measles). The overall estimate of children 13-59 months old who are fully immunized is 59.1%.

By age 24 months, all children should have received all their scheduled vaccines. Subsetting to the 13–59 months age group as opposed to the 13–23 months age group, yields a larger sample (n=619 vs. n=123), but may potentially decrease vaccination report (for those without cards) owing to recall bias. Because we did not collect specific timing and number of doses among those reporting without a vaccine card, this may result in overestimation of overall vaccination coverage.

By comparison, DHS reports that nationally 63.3% (60.0% with card, and 3.2% via mother's report) of children 13–23 months of age were fully vaccinated, which they define as BCG, measles, and three doses of triple vaccine (DPT) and polio. The corresponding reported figure for Zambézia was 44.7%. According to

the 2008 MICS survey, in Zambézia among children 13–23 months of age, 75.4% had a vaccination card, and based on both vaccination card and mother's report, 46.8% of children had been fully vaccinated (BCG + all polio + all DPT + measles) (MICS, 2008). Our survey finds the proportion of children with cards that are fully vaccinated is slightly lower than these and perhaps overestimates the proportion for those without cards that are fully vaccinated. Nonetheless this survey indicates that in Zambézia, the proportion of children fully vaccinated as evidenced by vaccination cards remains in the low range of 40-45%.

Table 17: Immunization of Children Aged 13 to 59 Months

	Zambézia-wide	95% CI
Head of household presents an immunization card (n=619)	57.8%	(50.6, 65.0)
BCG immunization record (n=344)		
Dose 1	91.6%	(86.5, 96.8)
Polio immunization record (n=344)		
Dose 1	88.9%	(83.6, 94.3)
Dose 2	84.7%	(78.4, 91.0)
Dose 3	80.5%	(73.5, 87.5)
Dose 4	74.5%	(66.5, 82.5)
DPT+HepB immunization record (n=344)		
Dose 1	87.1%	(81.7, 92.6)
Dose 2	81.9%	(74.8, 89.0)
Dose 3	79.0%	(70.8, 87.1)
Measles immunization record (n=344)		
Dose 1	81.9%	(74.4, 89.3)
Fully immunized (from card) (n=344)	66.9%	(57.4, 76.4)
Vitamin A Dose (from card)[b] (n=344)		
No	27.1%	(18.7, 35.5)
Yes	72.6%	(64.1, 81.0)
Do not know	0.3%	(0.0, 0.9)
No immunization card (n=619)	42.2%	(35.0, 49.4)
Reported vaccination (no card) (n=275)		
BCG	61.2%	(50.9, 71.5)
Polio	58.8%	(48.6, 69.1)
DPT	53.1%	(41.9, 64.4)
HepB	52.2%	(41.3, 63.1)
Measles	52.4%	(40.8, 64.1)
Estimate of fully immunized without card (BCG+Polio+DPT+HepB+Measles) (n=275)	48.5%	(37.6, 59.4)
Overall estimate of fully immunized (n=619)	59.1%	(51.1, 67.1)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

3.5 Child health

Several questions explored the most common health conditions among children under 5 years of age, including: fever, diarrhea, and respiratory problems (see tables 18– 20). Of all children under 5 years of age in the interviewed households, 55.3% had fever in the 30 days preceding the survey, 33.3% diarrhea, 33.3% had cough and 20.4% rapid or shallow breathing during the 30 days prior to the survey. There were no apparent differences in the reporting of these symptoms between children under 12 months as compared to those 13 to 59 months. Mothers reporting these symptoms largely reported also seeking advice or treatment, and doing so at health facilities primarily. Very small percentages indicated seeking advice or treatment from traditional healers. Of note, 100% of mothers reporting diarrhea in their children in the past 30 days sought advice or treatment for the child, and the great majority in health centers. Also, very high percentages (over 80%) reported using oral rehydration therapy to treat their child's diarrhea. Less than half (46.0% of children under 5 years, 45.6% of children under 12 months) had slept under a insecticide treated bednet during the previous night.

Table 18: Health Indicators of Children Aged 0-59 Months

	Zambézia-wide	95% CI
Head of household presents an immunization card (n=1229)	64.2%	(57.7, 70.8)
Child ill with fever in the last month (n=1229)		
No	43.6%	(39.4, 47.9)
Yes	55.3%	(51.0, 59.5)
Do not know	0.6%	(0.0, 1.2)
No response	0.5%	(0.0, 1.0)
Sought advice or treatment for the fever (n=622)	72.4%	(66.7, 78.1)
Source of advice or treatment for the fever (n=622)		
Family member	0.7%	(0.0, 1.6)
Other	3.6%	(1.7, 5.5)
Pharmacy	1.0%	(0.0, 2.0)
Traditional healer	2.2%	(0.6, 3.8)
No response	28.3%	(22.6, 34.0)
Health facility	64.2%	(56.8, 71.5)
Child ill with diarrhea in the last month (n=1229)		
No	66.2%	(62.6, 69.8)
Yes	33.3%	(29.6, 36.9)
Do not know	0.3%	(0.0, 0.9)
No response	0.2%	(0.0, 0.4)
Sought advice or treatment for the diarrhea (n=378)	69.4%	(63.1, 75.7)
Source of advice or treatment for the diarrhea (n=265)		
Health facility	88.2%	(83.2, 93.2)
Pharmacy	2.7%	(0.1, 5.3)
No response	1.3%	(0.0, 3.1)
Traditional healer	2.9%	(1.0, 4.8)
Other	3.8%	(1.1, 6.6)
Family member	1.1%	(0.0, 3.2)
Treatment received for the diarrhea (n=265)		
Food	4.0%	(0.2, 7.7)
Oral Rehydration therapy	77.4%	(70.0, 84.8)
Traditional remedy	4.1%	(1.3, 6.8)
Other	11.3%	(5.9, 16.7)
Do not know	1.9%	(0.0, 4.5)
No response	1.4%	(0.0, 3.4)
Child had cough or difficulty breathing in last month (n=1216)	33.3%	(29.3, 37.3)
Child had fast or shallow breathing in last month (n=1207)	20.4%	(16.9, 24.0)
Sought advice for breathing problem (n=180)	83.0%	(73.9, 92.1)
Child taken to health facility for breathing problem (n=181)	69.2%	(59.2, 79.2)
Slept under an insecticide treated bednet last night (n=1229)		
No	52.7%	(45.8, 59.5)
Yes	46.0%	(38.9, 53.2)
Do not know	0.9%	(0.2, 1.6)
No response	0.4%	(0.0, 0.9)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 19: Health Indicators of Children Aged 0-12 Months

	Zambézia-wide	95% CI
Child ill with fever in the last month[b] (n=610)		
No	45.4%	(39.1, 51.7)
Yes	53.3%	(47.0, 59.6)
Do not know	0.5%	(0.0, 1.2)
No response	0.7%	(0.0, 1.7)
Sought advice or treatment for the fever (n=305)	77.7%	(70.4, 85.1)
Source of advice or treatment for the fever[b] (n=305)		
Other	3.1%	(0.5, 5.6)
Pharmacy	0.7%	(0.0, 1.6)
Traditional healer	3.3%	(0.5, 6.1)
No response	22.3%	(14.9, 29.6)
Health facility	70.7%	(62.6, 78.8)
Child ill with diarrhea in the last month[b] (n=610)		
No	62.6%	(58.5, 66.7)
Yes	37.3%	(33.2, 41.5)
Do not know	0.1%	(0.0, 0.1)
No response	0.0%	(0.0, 0.0)
Sought advice or treatment for the diarrhea (n=218)	72.7%	(65.3, 80.2)
Source of advice or treatment for the diarrhea[b] (n=159)		
Health facility	89.0%	(83.1, 94.9)
Pharmacy	1.8%	(0.0, 4.1)
Traditional healer	3.5%	(0.6, 6.4)
Other	3.8%	(0.3, 7.3)
Family member	1.9%	(0.0, 5.6)
Treatment received for the diarrhea[b] (n=159)		
Food	0.3%	(0.0, 0.6)
Oral Rehydration therapy	80.0%	(70.5, 89.4)
Traditional remedy	5.6%	(1.1, 10.0)
Other	9.2%	(3.8, 14.7)
Do not know	3.3%	(0.0, 7.8)
No response	1.6%	(0.0, 4.7)
Child had cough or difficulty breathing in last month (n=604)	29.9%	(24.7, 35.0)
Child had fast or shallow breathing in last month (n=598)	13.7%	(10.8, 16.5)
Sought advice for breathing problem (n=74)	86.4%	(77.0, 95.8)
Child taken to health facility for breathing problem (n=75)	80.4%	(70.4, 90.4)
Slept under an insecticide treated bednet last night[b] (n=610)		
No	53.1%	(45.0, 61.3)
Yes	45.6%	(37.1, 54.0)
Do not know	0.8%	(0.0, 1.6)
No response	0.5%	(0.0, 1.0)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 20: Health Indicators of Children Aged 13-59 Months

	Zambézia-wide	95% CI
Child ill with fever in the last month[b] (n=619)		
No	42.0%	(37.2, 46.9)
Yes	57.0%	(52.2, 61.9)
Do not know	0.6%	(0.0, 1.7)
No response	0.3%	(0.0, 0.8)
Sought advice or treatment for the fever (n=317)	67.8%	(60.1, 75.5)
Source of advice or treatment for the fever[b] (n=317)		
Family member	1.3%	(0.0, 2.9)
Other	4.0%	(1.8, 6.3)
Pharmacy	1.3%	(0.0, 2.7)
Traditional healer	1.3%	(0.0, 2.8)
No response	33.5%	(25.8, 41.2)
Health facility	58.6%	(49.3, 67.9)
Child ill with diarrhea in the last month[b] (n=619)		
No	69.5%	(63.9, 75.0)
Yes	29.6%	(24.1, 35.1)
Do not know	0.6%	(0.0, 1.7)
No response	0.3%	(0.0, 0.8)
Sought advice or treatment for the diarrhea (n=160)	65.5%	(57.0, 73.9)
Source of advice or treatment for the diarrhea[b] (n=106)		
Health facility	87.1%	(78.6, 95.6)
Pharmacy	3.9%	(0.0, 8.9)
No response	3.0%	(0.0, 7.1)
Traditional healer	2.0%	(0.0, 4.7)
Other	3.9%	(0.2, 7.7)
Treatment received for the diarrhea[b] (n=106)		
Food	8.8%	(0.3, 17.3)
Oral Rehydration therapy	73.9%	(63.3, 84.6)
Traditional remedy	2.1%	(0.0, 4.7)
Other	14.1%	(5.9, 22.3)
Do not know	0.0%	(0.0, 0.1)
No response	1.1%	(0.0, 3.3)
Child had cough or difficulty breathing in last month (n=612)	36.4%	(31.2, 41.7)
Child had fast or shallow breathing in last month (n=609)	26.5%	(20.5, 32.6)
Sought advice for breathing problem (n=106)	81.4%	(69.8, 92.9)
Child taken to health facility for breathing problem (n=106)	63.6%	(50.5, 76.8)
Slept under an insecticide treated bednet last night[b] (n=619)		
No	52.2%	(44.3, 60.1)
Yes	46.5%	(38.3, 54.6)
Do not know	1.0%	(0.0, 1.9)
No response	0.4%	(0.0, 0.8)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 21 summarizes responses regarding head of household knowledge of child health issues. Most women report knowing the most common places to get vaccinations for their children, naming health facilities, and sometimes school and health brigades. A large proportion of the women are aware that vaccinations help their children grow healthy (19.0%) or protect them from illness (63.5%), but a sizable proportion do not know the purpose of vaccination (13.1%). Even though the majority of women had heard of a product available locally to treat diarrhea, a significant proportion (18.1%) had not; a third of women felt that children with diarrhea should be given less fluids. Women were asked to name as many examples as they could of situations for which their child would require immediate medical attention. The following responses were counted as correct: fever, cannot drink water, breastfeed or eat, coughing and rapid or difficult breathing, blood in stool, or convulsions. Only a small proportion of women interviewed were able to provide more than two correct responses (9.2%); more named one correct instance (30.3%)

than two correct instances (30.1%).

Table 21: Child Health Practices/Knowledge in Households with Children Aged 0-59 Months

	Zambézia-wide	95% CI
Locations identified to obtain vaccination, if needed (n=1813)[c]		
Hospital	86.1%	(83.2, 89.1)
Health facility	25.4%	(20.7, 30.1)
School	18.2%	(15.0, 21.4)
Mobile brigade	10.6%	(7.6, 13.5)
Church	1.1%	(0.3, 1.9)
Traditional Healer	0.8%	(0.2, 1.3)
Outreach sites	1.2%	(0.2, 2.2)
Other	0.9%	(0.2, 1.6)
Do not know	4.6%	(2.8, 6.4)
Reason for vaccinating children[b] (n=1813)		
Heal them	2.3%	(1.3, 3.4)
Help them grow healthy	19.0%	(16.0, 21.9)
Protect from illness	63.5%	(60.0, 67.0)
Other	0.4%	(0.0, 0.8)
Do not know	13.1%	(10.1, 16.1)
No response	1.7%	(0.9, 2.5)
Give children with diarrhea more or less fluid?[b] (n=1813)		
More	32.9%	(27.5, 38.4)
Same	14.0%	(11.0, 16.9)
Less	39.2%	(34.6, 43.7)
No response	13.9%	(10.9, 17.0)
Heard of product available locally to treat diarrhea[b] (n=1813)		
No	18.1%	(14.2, 22.1)
Yes	68.2%	(63.5, 72.8)
Do not know	3.7%	(2.2, 5.1)
No response	10.0%	(7.5, 12.5)
Knowledge of when a child needs immediate medical attention[b] (n=1813)		
No correct	16.0%	(13.2, 18.8)
One correct	30.3%	(27.1, 33.4)
Two correct	30.1%	(26.4, 33.8)
More than two correct	9.2%	(7.1, 11.4)
Do not know	4.6%	(2.3, 7.0)
No response	9.8%	(7.5, 12.1)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

[c] Percentages may sum to greater than 100%.

3.6 Malaria

Table 22 provides information on malaria in the household. A majority of respondents reported having had malaria either currently (9.4%), recently (34.6%) or in the more distant past (26.9%). Among those reporting having had malaria the median (IQR) time since they last had it was 3 (1, 12) months, ranging from 0 to 1440 months. Over a third of household respondents (36.5%) reported having a bednet for each and every sleeping mat or bed, while 22.0% reported they did not have enough nets for all of the sleeping mats or beds. The median (IQR) number of nets that were purchased per household was 1 (0, 2), and the median (IQR) number of nets donated was 1 (0, 2). Sleeping under a net the night prior to the survey administration was reported by 44.5% of respondents. Of those women who had been pregnant, 49.5% reported having slept under a net during the last pregnancy while nearly half (47.3%) had not.

Table 22: Malaria Occurrence and Prevention

	Zambézia-wide	95% CI
Fell ill with malaria[b] (n=3749)		
No	26.0%	(22.5, 29.5)
Yes now	9.4%	(7.7, 11.2)
Yes recently	34.6%	(31.0, 38.1)
Yes past	26.9%	(23.4, 30.3)
Do not know	1.6%	(0.9, 2.4)
No response	1.6%	(0.6, 2.5)
If ever had malaria, duration since last infection (months)[a] (n=1996)	3 (1, 12)	
Inventory of household mosquito nets[b] (n=3749)		
None	35.3%	(30.3, 40.2)
Less than the number of beds/sleeping mats	22.0%	(17.7, 26.4)
One for every bed/sleeping mat	36.5%	(33.2, 39.9)
More than the number of beds/sleeping mats	3.5%	(2.2, 4.7)
Do not know	1.0%	(0.2, 1.7)
No response	1.7%	(0.9, 2.5)
Number of mosquito nets purchased[a] (n=1853)	1 (0, 2)	
Number of mosquito nets donated[a] (n=1873)	1 (0, 2)	
Respondent slept under mosquito net previous night[b] (n=3749)		
No	53.7%	(47.8, 59.7)
Yes	44.5%	(38.6, 50.5)
Do not know	0.5%	(0.0, 1.1)
No response	1.2%	(0.4, 2.0)
During last pregnancy, respondent slept under mosquito net[b] (n=3259)		
No	47.3%	(42.3, 52.4)
Yes	49.5%	(44.3, 54.7)
Do not know	0.9%	(0.3, 1.5)
No response	2.3%	(1.1, 3.4)

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

3.7 Knowledge of HIV services

Of all respondents, 42.1% knew about counseling and testing (CT) services , and only 38.6% knew that HIV infection can be treated using anti-retroviral medicines (ART), see table 23. Among those who knew about CT and ART services, the large majority knew the services can be obtained in hospitals and in some cases other health facilities. Schools (5.9%) and churches (3.2%) were in some instances reported as places that offer CT services, and in smaller percentages provide ART services. Of those who know about CT services, 33.9% had received CT in the past six months and 30.5% had received CT services prior to the past 6 months. Most of those receiving CT had received their results (73.8% of those receiving service in the last six months and 84.3% of receiving service before the last six months).

The majority of respondents knowledgeable of ART believed that ART can help HIV+ people be healthier (74.4%), but a sizable proportion did not believe it (12.6%), and many said they did not know (12.9%). A very small percent of respondents who know about ART services (1.3%) indicated that traditional healers also provide ART services, while 22.9% reported that traditional healers can help people with HIV.

Table 23: HIV Services

	Zambézia-wide	95% CI
Knows of counseling and testing services[b] (n=3749)		
No	51.9%	(46.2, 57.5)
Yes	42.1%	(36.2, 47.9)
Do not know	4.8%	(3.4, 6.2)
No response	1.2%	(0.5, 2.0)
Among respondents who know of CT:		
Locations identified to receive CT (n=1162)[c]		
Hospital	81.2%	(75.7, 86.7)
Health facility	24.4%	(19.1, 29.7)
School	5.9%	(3.2, 8.5)
Church	3.2%	(1.0, 5.4)
Traditional Healer	0.9%	(0.0, 1.8)
Other	0.0%	(0.0, 0.1)
Do not know	1.0%	(0.0, 2.0)
Received CT in past 6 months[b] (n=1162)		
No	64.8%	(59.4, 70.2)
Yes	33.9%	(28.5, 39.3)
Do not know	0.3%	(0.0, 0.7)
No response	1.0%	(0.0, 2.0)
Received CT result (n=374)	73.8%	(66.6, 81.0)
Received CT prior to past 6 months[b] (n=1162)		
No	67.5%	(62.7, 72.3)
Yes	30.5%	(25.6, 35.4)
Do not know	0.5%	(0.0, 1.1)
No response	1.5%	(0.3, 2.7)
Received CT result (n=355)	84.3%	(77.7, 90.8)
Believes it is worthwhile to test and know HIV status[b] (n=1162)		
No	21.2%	(16.6, 25.7)
Yes	69.0%	(63.6, 74.5)
Do not know	8.3%	(5.3, 11.4)
No response	1.5%	(0.4, 2.7)
Knows that HIV can be treated[b] (n=3749)		
No	48.5%	(43.8, 53.1)
Yes	38.6%	(32.8, 44.4)
Do not know	12.1%	(9.6, 14.7)
No response	0.8%	(0.2, 1.4)
Among respondents who know of ART:		
Locations identified to receive ART (n=1049)[c]		
Hospital	85.1%	(81.2, 89.0)
Health facility	25.5%	(19.3, 31.7)
School	2.3%	(1.1, 3.5)
Church	1.1%	(0.0, 2.1)
Traditional Healer	1.3%	(0.3, 2.4)
Other	0.3%	(0.0, 1.0)
Do not know	1.3%	(0.2, 2.4)
ART helps people with HIV to be healthier[b] (n=1049)		
No	12.6%	(8.4, 16.9)
Yes	74.4%	(68.3, 80.5)
Do not know	12.9%	(8.7, 17.0)
No response	0.1%	(0.0, 0.2)
Traditional healers can help people with HIV[b] (n=1049)		
No	62.7%	(57.5, 67.9)
Yes	22.9%	(18.8, 27.0)
Do not know	13.0%	(8.9, 17.1)
No response	1.4%	(0.1, 2.6)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

[c] Percentages may sum to greater than 100%.

3.8 Knowledge of prevention and transmission of HIV

Table 24 shows results about various aspects of knowledge of prevention and transmission of HIV. Respondents were asked about knowledge of transmission and modes of prevention between adults and from mother to child. The following responses were marked as correct, when respondent mentioned the subject, as the interviewers were instructed not to read the answers.

Transmission between adults:

- anal, vaginal or oral sex without protection,
- direct contact with blood or other body fluids,
- needle sharing,
- unsafe blood transfusions,
- and accidents in hospital or health care setting.

Transmission from mother to child:

- before childbirth or during childbirth,
- through breast milk, if infected and does not receive ART.

Prevention between adults:

- using condoms, prophylactics or other protection made of latex,
- abstaining from sex or delaying debut,
- having only one sexual partner after knowing both partners are healthy

Prevention of mother-to-child transmission:

- prevention of infection in the future parents,
- avoiding pregnancy when mother is HIV+,
- using ART during pregnancy,
- using ART for the new born child,
- using safe practices for infant feeding instead of breastfeeding.

Respondents gave one correct response in 33.1% (adult transmission), 36.0% (adult prevention), 35.4% (mother-to-child transmission), and 24.7% (mother-to-child transmission prevention) of the cases. Percentages fell under 20% for two correct responses, and around half did not know or did not respond to the question.

Respondents were asked their perceived chance of becoming infected with HIV. Of all respondents, 21.4% believed they had no chance, 16.8% responded a small chance of getting infected, while 5.4% believed they had a good chance and 1.6% reported being infected. Of note 47.9% and 6.8% did not know and did not want to respond to this question, respectively. Finally, 61.3% of respondents knew that there is no cure for AIDS, contrasting with 8.8% who believed there is a cure; over one quarter (26.0%) of participants responded that they did not know.

Table 24: HIV Knowledge

	Zambézia-wide	95% CI
When questioned how one adult man or woman can transmit HIV[b] (n=3749)		
No response	4.2%	(2.5, 5.9)
One correct response	33.1%	(29.9, 36.2)
Two correct responses	20.7%	(17.0, 24.4)
None	24.5%	(21.3, 27.8)
Do not know	17.5%	(14.5, 20.5)
When questioned how to prevent HIV transmission[b] (n=3749)		
No response	5.6%	(3.4, 7.7)
One correct response	36.0%	(32.1, 39.9)
Two correct responses	14.2%	(11.5, 16.9)
None	25.1%	(22.2, 28.0)
Do not know	19.1%	(16.0, 22.3)
When questioned how a mother can transmit HIV[b] (n=3749)		
No response	4.7%	(2.9, 6.6)
One correct response	35.4%	(31.4, 39.4)
Two correct responses	11.8%	(9.3, 14.3)
None	26.9%	(23.9, 29.9)
Do not know	21.1%	(18.2, 24.1)
When questioned how to prevent HIV transmission from mother to child[b] (n=3749)		
No response	6.2%	(4.2, 8.2)
One correct response	24.7%	(21.7, 27.7)
Two correct responses	15.1%	(12.1, 18.2)
None	27.2%	(24.3, 30.2)
Do not know	26.7%	(23.3, 30.2)
Chance that respondent will become infected with HIV[b] (n=3749)		
No chance	21.4%	(18.3, 24.5)
Small chance	16.8%	(13.2, 20.4)
Good chance	5.4%	(3.9, 7.0)
Already infected	1.6%	(0.7, 2.6)
Do not know	47.9%	(43.0, 52.8)
No response	6.8%	(4.7, 8.9)
Believes AIDS has a cure[b] (n=3749)		
No	61.3%	(57.6, 65.0)
Yes	8.8%	(6.7, 10.9)
Do not know	26.0%	(22.4, 29.6)
No response	3.9%	(2.6, 5.2)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

3.9 Health care access and satisfaction

Table 25 describes heath care utilization and satisfaction. Respondents were asked if they had EVER used various venues for health care. Of all respondents, 73.1% reported having ever visited a government health facility for a health problem, 21.3% reported having used a private or local pharmacy to deal with a health problem and 43.1% reported having used a traditional healer to address a health problem.

Among those who had visited a health facility, the median (IQR) time since the last visit was 2 (1, 3) months (range: 0–888 months), 86.0% were satisfied with the care provided, 84.6% reported that their health problem improved, 88.0% reported the health facility was clean, and 92.5% would return to the health facility for care. For those visiting a private pharmacy, 89.9% reported they were treated well by the pharmacist, 90.5% were satisfied with the care, 86.0% reported their health problem improved, and the median (IQR) time since last visit was 2 (1, 3) months (range: 0–998 months). For those visiting a traditional healer, 79.2% reported being treated well by the healer, 75.5% reported being satisfied with the care received, 69.8% reported their health problem improved, and the median (IQR) time since the last

visit was 2 (1, 4) (range: 0–888 months).

Table 25: Health Care Access and Satisfaction

	Zambézia-wide	95% CI
Ever visited a government health facility for health problem[b] (n=3749)		
No	25.6%	(22.1, 29.2)
Yes	73.1%	(69.3, 76.9)
Do not know	0.2%	(0.0, 0.5)
No response	1.0%	(0.4, 1.7)
Among those who have ever visited a government health facility:		
Duration since last visit (months)[a] (n=2315)	2 (1, 3)	
Treated well by staff[b] (n=2324)		
No	10.5%	(7.8, 13.2)
Yes	88.9%	(86.3, 91.6)
Do not know	0.3%	(0.0, 0.6)
No response	0.3%	(0.0, 0.8)
Satisfied with care received[b] (n=2324)		
No	13.1%	(9.6, 16.5)
Yes	86.0%	(82.5, 89.5)
Do not know	0.3%	(0.0, 0.6)
No response	0.7%	(0.0, 1.4)
Health improved[b] (n=2324)		
No	14.5%	(11.8, 17.2)
Yes	84.6%	(81.8, 87.3)
Do not know	0.7%	(0.1, 1.3)
No response	0.2%	(0.0, 0.4)
Health facility was clean[b] (n=2324)		
No	7.6%	(5.6, 9.6)
Yes	88.0%	(84.9, 91.0)
Do not know	4.0%	(2.0, 6.0)
No response	0.4%	(0.0, 0.8)
Would return to health facility[b] (n=2324)		
No	4.3%	(2.5, 6.0)
Yes	92.5%	(90.0, 95.0)
Do not know	2.4%	(1.1, 3.7)
No response	0.8%	(0.1, 1.5)
Number of visits to health facility by any household member in 3 months[a] (n=3334)	1 (0, 2)	
Ever visited a private or local pharmacist for health problem[b] (n=3749)		
No	75.0%	(69.7, 80.3)
Yes	21.3%	(16.0, 26.7)
Do not know	2.2%	(1.1, 3.3)
No response	1.5%	(0.6, 2.3)
Among those who have ever visited a pharmacist:		
Duration since last visit (months)[a] (n=695)	2 (1, 3)	
Treated well by pharmacist[b] (n=699)		
No	9.4%	(5.0, 13.9)
Yes	89.9%	(85.4, 94.4)
Do not know	0.6%	(0.0, 1.4)
No response	0.0%	(0.0, 0.1)
Satisfied with care received[b] (n=699)		
No	8.9%	(5.2, 12.5)
Yes	90.5%	(86.7, 94.3)
Do not know	0.5%	(0.0, 1.4)
No response	0.0%	(0.0, 0.1)
Health improved[b] (n=699)		
No	12.4%	(7.9, 17.0)
Yes	86.0%	(81.6, 90.4)
Do not know	1.6%	(0.0, 3.1)
No response	0.0%	(0.0, 0.1)
Number of visits to pharmicist by any household member in 3 months (n=3206)	0 (0, 1)	

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Table 25 – Health Care Access and Satisfaction, *Continued*

	Zambézia-wide	95% CI
Ever visited a traditional healer for health problem[b] (n=3749)		
No	54.5%	(50.5, 58.5)
Yes	43.1%	(39.1, 47.0)
Do not know	0.7%	(0.1, 1.3)
No response	1.7%	(1.0, 2.5)
Among those who have ever visited a traditional healer:		
Duration since last visit (months)[a] (n=1501)	2 (1, 4)	
Treated well by traditional healer[b] (n=1504)		
No	19.1%	(14.1, 24.0)
Yes	79.2%	(74.3, 84.1)
Do not know	1.4%	(0.2, 2.6)
No response	0.4%	(0.0, 1.1)
Satisfied with care received[b] (n=1504)		
No	23.2%	(18.2, 28.1)
Yes	75.5%	(70.5, 80.5)
Do not know	0.9%	(0.0, 1.9)
No response	0.5%	(0.0, 1.1)
Health improved[b] (n=1504)		
No	28.6%	(22.9, 34.4)
Yes	69.8%	(63.8, 75.7)
Do not know	0.7%	(0.0, 1.7)
No response	0.8%	(0.0, 1.8)
Number of visits to traditional healer by any household member in 3 months[a] (n=3249)	0 (0, 1)	

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

4 Objective 2: Hygiene practices and use of clean water and sanitation facilities increased

4.1 Water and sanitation

Table 26 summarizes information on water and sanitation. The most frequently reported drinking water sources include wells (57.2%), rivers (23.7%), and public faucets (16.1%). Only (5.4%) of households are reported to use their own faucet for drinking water. Sources of cooking water generally follow the same distribution of those reported for drinking water. Water used for washing was similar with the exception that the number of respondents using river water for washing is greater (44.0%). The vast majority of households did not report treating drinking water (80.7%). In addition, of these 17.7% reporting treatment of water to make it safer, 23.0% then said they used nothing to treat the water. Respondents reported using bleach (41.9%) and boiling (28.0%) primarily to treat drinking water. Most respondents (94.3%) reported washing her hands the day prior to the survey, specifically after using latrine (70.1%), after cleaning feces (51.9%), before preparing food (42.7%).

Most households do not use a latrine (62.7%). Of the 35.6% that do, the majority are unimproved latrines (71.8%), 17.0% are traditional improved latrines, 5.3% improved latrines with cement slab, 2.8% non-flush latrines connected to a septic tank, and 0.4% flush latrines connected to septic tank. In 21.5% of the cases where there are latrines, these are shared with one or more families. The percentage of households using secure latrines (flush latrine, non-flush latrine, traditional or common improved latrines as defined by MICS) was reported to be 7.5% in Zambézia (MICS, 2008), compared to 9.1% of all households in this survey.

Table 26: Water and Sanitation

	Zambézia-wide	95% CI
Main source(s) of drinking water (n=3749):		
Own faucet	5.4%	(2.2, 8.6)
Public faucet	16.1%	(10.9, 21.2)
Rain	1.4%	(0.8, 2.1)
River	23.7%	(18.3, 29.1)
HH container	0.5%	(0.2, 0.9)
Bottled	0.3%	(0.0, 0.8)
Well	57.2%	(49.8, 64.6)
Other	4.3%	(2.0, 6.7)
Do not know	0.6%	(0.1, 1.1)
Main source(s) of cooking water (n=3749):		
Own faucet	3.9%	(1.2, 6.6)
Public faucet	12.9%	(8.7, 17.1)
Rain	1.1%	(0.6, 1.7)
River	25.6%	(19.9, 31.3)
HH container	3.2%	(1.5, 4.9)
Bottled	0.1%	(0.0, 0.3)
Well	57.1%	(50.6, 63.6)
Other	4.4%	(2.0, 6.7)
Do not know	0.2%	(0.0, 0.4)
Main source(s) of wash water (n=3749):		
Own faucet	4.7%	(1.8, 7.6)
Public faucet	11.8%	(7.9, 15.7)
Rain	3.0%	(2.0, 4.1)
River	44.0%	(37.4, 50.5)
HH container	1.2%	(0.6, 1.9)
Bottled	0.2%	(0.0, 0.4)
Well	46.8%	(41.1, 52.6)
Other	3.8%	(1.5, 6.1)
Do not know	0.2%	(0.0, 0.5)
Location of water source[b] (n=3749)		
There is no water source	18.8%	(15.0, 22.7)
In the neighborhood	49.3%	(42.4, 56.2)
In the block	23.4%	(17.7, 29.0)
In the house	7.1%	(4.4, 9.8)
Do not know	0.5%	(0.1, 1.0)
No response	0.8%	(0.3, 1.4)
Household treats drinking water[b] (n=3749)		
No	80.7%	(77.4, 84.0)
Yes	17.7%	(14.3, 21.0)
Do not know	0.4%	(0.0, 0.7)
No response	1.2%	(0.5, 1.9)
Methods used to make water safer to drink[b] (n=568)		
Bleach	41.9%	(31.6, 52.3)
Boiling	28.0%	(18.7, 37.4)
Water filter	3.1%	(0.0, 6.4)
Other	2.4%	(0.0, 4.9)
Nothing	23.0%	(13.5, 32.5)
Do not know	1.0%	(0.0, 2.8)
No response	0.5%	(0.0, 1.3)
Time to cooking water source (minutes)[a] (n=3639)	10 (2, 30)	
Mode of transport to water source[b] (n=3749)		
Bicycle	2.4%	(1.4, 3.4)
Bus	0.0%	(0.0, 0.1)
Car	0.0%	(0.0, 0.0)
No response	6.0%	(4.3, 7.6)
On foot	91.6%	(89.8, 93.4)
Household has a water filter[b] (n=3749)		

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Table 26 – Water and Sanitation, *Continued*

	Zambézia-wide	95% CI
Do not know	94.0%	(92.2, 95.9)
No	1.3%	(0.6, 2.0)
No response	3.8%	(2.1, 5.5)
Yes	0.8%	(0.1, 1.6)
Washed hands yesterday[b] (n=3749)		
No	4.6%	(3.2, 6.0)
Yes	94.3%	(92.6, 95.9)
Do not know	0.2%	(0.0, 0.4)
No response	0.9%	(0.3, 1.5)
Situations for hand washing (n=3412):		
After using latrine	70.1%	(65.7, 74.6)
After cleaning feces	51.9%	(46.8, 56.9)
Before food preparation	61.9%	(57.0, 66.9)
Before feeding children	48.3%	(42.8, 53.8)
Before eating	42.7%	(37.8, 47.7)
Other	1.4%	(0.3, 2.4)
Washed hands with soap, detergent, or ashes[b] (n=3412)		
No	35.9%	(30.1, 41.7)
Yes	63.5%	(57.7, 69.4)
Do not know	0.2%	(0.0, 0.5)
No response	0.3%	(0.0, 0.7)
Household uses a latrine[b] (n=3749)		
No	62.7%	(56.2, 69.1)
Yes	35.6%	(29.3, 41.9)
Do not know	0.1%	(0.0, 0.3)
No response	1.6%	(0.9, 2.4)
Among those households using a latrine (n=995):		
Latrine type[b] (n=995)		
Unimproved latrine	71.8%	(60.6, 82.9)
Traditional Improved Latrine	17.0%	(9.5, 24.5)
Improved Latrine (with support structure)	5.3%	(0.9, 9.7)
Non-flush latrine connected to septic tank	2.8%	(0.0, 5.8)
Flush latrine connected to septic tank	0.4%	(0.0, 1.0)
Other	0.6%	(0.0, 1.4)
Do not know	0.0%	(0.0, 0.1)
No response	2.1%	(0.0, 4.3)
Household shares latrine[b] (n=995)		
No	77.9%	(72.1, 83.6)
Yes	21.5%	(15.7, 27.4)
No response	0.6%	(0.0, 1.3)
Number of households sharing latrine[a] (n=248)	3 (2, 4)	

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

[c] Percentages may sum to greater than 100%.

5 Objective 3: Livelihood capabilities protected and enhanced

5.1 Food and nutrition

The survey intended to collect information to construct the Household Food Insecurity and Access Score (HFIAS) score, which yields information on food insecurity (access) at the household level (Coates et al., 2007). Four types of indicators can be calculated to help understand the characteristics of and changes in household food insecurity (access) in the surveyed population. These indicators provide summary information on household food insecurity and access, including conditions, domains, scale, and prevalence. Unfortunately there was an error in the skip logic on the mobile data collection device that rendered the scale unusable, and the only valid indicator of the list we were able to collect is any response regarding the availability of food in the past four weeks in the household.

When asked if at any time during the past four weeks there had been no food of any kind because of lack of resources, 33.8% responded affirmatively. Of those who responded affirmatively, 16.9% reported that it occurs often, 47.0% said it occurs sometimes, and 34.0% said that it occurs rarely. See table 27.

Household dietary diversity scores (HDDS) are calculated by summing the number of food groups consumed in the household over the 7 day recall period (FAO Nutrition and Consumer Protection Division, 2008). For the household dietary diversity score, 12 food groups are summed:

1. Maize or Cereals [survey items 1 and 2]
2. Roots and Tubers [3]
3. Vegetables [4 and 8]
4. Sugar or sugar products [5]
5. Beans [6]
6. Nuts [7]
7. Fruits [9]
8. Meat [10]
9. Poultry and Eggs [11]
10. Fish [12]
11. Oils and fats [13]
12. Milk and milk products [14]

Household dietary diversity was high. The median (IQR) HDDS was 7 (5, 9); the range is 0 to 12. See table 27.

Table 27: Food and Nutrition

	Zambézia-wide	95% CI
Household Dietary Diversity Score (HDDS)[a] (n=3749)	7 (5, 9)	
HDDS > 1	98.7%	(98.0, 99.5)
HDDS > 3	85.9%	(82.3, 89.4)
HDDS > 5	64.8%	(59.3, 70.4)
HDDS > 7	44.0%	(38.2, 49.9)
HDDS > 9	24.0%	(18.9, 29.1)
HDDS > 11	6.6%	(4.0, 9.3)
In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?[b] (n=3749)		
No	64.2%	(60.3, 68.1)
Yes	33.8%	(30.0, 37.5)
Do not know	1.3%	(0.4, 2.3)
No response	0.7%	(0.1, 1.2)
How often did this happen?[b] (n=1190)		
Rarely	34.0%	(28.1, 39.9)
Sometimes	47.0%	(41.1, 52.9)
Often	16.9%	(12.2, 21.7)
Do not know	1.0%	(0.0, 2.3)
No response	1.1%	(0.0, 2.4)

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

5.2 Livelihood and agricultural practices

Most households report receiving income through the sale of agricultural products (62.0%) or other local natural resources (firewood, grass, charcoal, construction materials, etc.) (15.0%). Smaller proportions receive income through the sale of animals (7.5%) and wage labor (10.9%). Over one quarter of households reported receiving no income (30.4%), and nearly half reported receiving up to 1000 Mts per month (28 USD at the exchange rate of Sep 25, 2010), or roughly 1 USD per day. This means that roughly 75% of households in Zambézia report having an income of 1 or less USD per day. See table 28.

Most of the respondents reported farming (63.9%) and household work (23.0%) as their primary occupation. Very small percentages of households reported any business or wage work as primary occupation. In most households (89.9%) there is a garden or small farm and household members sell crops from that farm (53.9%), although produce is not sold in 34.0% of the households. Among households with small farms, 36.8% report the soil is not good for food production. The farm productivity was reported to be limited by several conditions including soil quality, water, land area, time, and money. The most frequently cited conditions affecting farm productivity was water and drought (27.0% and 10.4%, respectively). Regarding farming practices, 55.2% of households report regularly burning their fields, but very few use chemical products such as fertilizers (3.5%) and pesticides (2.2%). The vast majority of households do not irrigate their farms (95.4%), use conservation farming techniques (83.5%), nor receive any advice or training on conservation farming techniques (90.3%). About equal proportions of households have livestock versus no livestock. See table 29.

Table 28: Livelihood Capabilities and Agriculture

	Zambézia-wide	95% CI
Source(s) of income (n=3749):[c]		
Local natural resources	15.0%	(11.8, 18.1)
Selling agriculture products	62.0%	(55.7, 68.4)

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Table 28 – Livelihood Capabilities and Agriculture, *Continued*

	Zambézia-wide	95% CI
Selling animals	7.5%	(5.3, 9.6)
Wage labor	10.9%	(6.9, 14.8)
Remittances	3.2%	(2.0, 4.4)
Other	0.7%	(0.2, 1.1)
Do not know	15.1%	(12.1, 18.2)
Household income (sum of all members' monthly earnings)[b] (n=3749)		
No income	30.4%	(25.7, 35.1)
Up to Mts 200	17.7%	(14.8, 20.6)
Mts 200–400	11.3%	(8.9, 13.6)
Mts 400–600	8.4%	(6.6, 10.1)
Mts 600–800	5.0%	(3.5, 6.6)
Mts 800–1000	5.4%	(3.7, 7.0)
Mts 1000–1500	4.8%	(3.2, 6.4)
Mts 1500–2000	3.6%	(2.1, 5.1)
Mts 2000–4000	3.0%	(1.6, 4.4)
Mts 4000–7000	0.6%	(0.0, 1.1)
More than Mts 7000	0.8%	(0.2, 1.4)
No response	9.1%	(7.3, 11.0)
How have natural resources changed in past 10 years?[b] (n=3749)		
Decreased	46.2%	(41.7, 50.7)
Remained same	24.7%	(20.6, 28.8)
Increase	12.2%	(10.3, 14.0)
Do not know	4.7%	(3.3, 6.2)
No response	12.2%	(9.1, 15.4)
Primary occupation[b] (n=3749)		
Farming	63.9%	(59.7, 68.2)
None	4.9%	(3.3, 6.4)
Wage labor	2.4%	(1.0, 3.7)
Business	3.5%	(2.3, 4.8)
No response	1.3%	(0.6, 2.0)
Other	0.9%	(0.1, 1.6)
Household work	23.0%	(20.2, 25.8)
Do not know	0.1%	(0.0, 0.3)
Total area of land (hectares)[a] (n=3086)	2 (1, 3)	
Household member has a farm[b] (n=3749)		
No	8.7%	(5.8, 11.6)
Yes	89.9%	(86.8, 93.1)
Do not know	0.0%	(0.0, 0.1)
No response	1.3%	(0.6, 2.0)
Sell crops[b] (n=3749)		
No	34.0%	(29.2, 38.9)
Yes	53.9%	(48.6, 59.1)
Do not know	1.2%	(0.6, 1.8)
No response	10.9%	(8.2, 13.6)
Own livestock[b] (n=3749)		
No	50.4%	(45.1, 55.8)
Yes	48.1%	(42.6, 53.6)
Do not know	0.0%	(0.0, 0.1)
No response	1.4%	(0.7, 2.1)
Among households with small farms (n=3086):		
Soil is adequate for food production[b] (n=3086)		
No	36.8%	(31.3, 42.2)
Yes	57.8%	(52.3, 63.4)
Do not know	2.5%	(1.5, 3.6)
No response	2.8%	(0.8, 4.9)
Garden productivity is limited by (n=3086):[c]		
Water	27.0%	(22.1, 31.9)
Soil quality	34.2%	(29.3, 39.1)
Land area	25.5%	(20.7, 30.3)

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Table 28 – Livelihood Capabilities and Agriculture, *Continued*

	Zambézia-wide	95% CI
Time	14.3%	(11.0, 17.7)
Money	23.8%	(19.9, 27.8)
Drought	10.4%	(7.7, 13.0)
Other	3.3%	(1.9, 4.6)
Not limited	9.7%	(6.8, 12.6)
Do not know	2.4%	(1.2, 3.5)
Regularly burn fields[b] (n=3086)		
No	41.1%	(37.1, 45.1)
Yes	55.2%	(50.2, 60.2)
Do not know	1.4%	(0.5, 2.3)
No response	2.3%	(0.6, 4.0)
Use chemical fertilizers[b] (n=3086)		
No	90.7%	(88.2, 93.1)
Yes	3.5%	(2.4, 4.6)
Do not know	3.6%	(2.1, 5.1)
No response	2.3%	(0.7, 3.8)
Use pesticides[b] (n=3086)		
No	89.6%	(87.0, 92.3)
Yes	2.2%	(1.3, 3.2)
Do not know	6.3%	(4.3, 8.3)
No response	1.9%	(0.6, 3.1)
Irrigate[b] (n=3086)		
No response	0.2%	(0.0, 0.5)
No	95.4%	(94.0, 96.8)
Yes	4.4%	(3.0, 5.8)
Among those who irrigate (n=157):		
Drip irrigation	30.9%	(16.5, 45.2)
Bucket or watering can	69.5%	(55.3, 83.7)
Gasoline pump	30.9%	(16.5, 45.2)
Manual pump	4.1%	(0.0, 10.3)
Gravity or canal	4.0%	(0.0, 10.3)
Use conservation farming[b] (n=3086)		
No	83.5%	(79.5, 87.5)
Yes	9.5%	(6.7, 12.2)
Do not know	5.1%	(3.7, 6.6)
No response	1.9%	(0.7, 3.1)
Conservation farming technique usage (n=232):		
Permanent planting holes	50.2%	(34.0, 66.4)
Plant lines	46.8%	(33.2, 60.5)
Rotate crops	25.0%	(12.7, 37.3)
Feritilizer/manure	9.4%	(2.5, 16.4)
Mulching	8.0%	(1.8, 14.1)
Other	3.8%	(0.0, 8.5)
Received conservation farming training in last 12 months[b] (n=3086)		
No	90.3%	(88.1, 92.5)
Yes	5.8%	(4.1, 7.5)
Do not know	3.3%	(1.7, 4.8)
No response	0.6%	(0.1, 1.0)

[a] Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.
[c] Percentages may sum to greater than 100%.

Only 9.2% of respondents reported that they do not grow any crops, although there some non-response (2.2%). Among those who grow crops, nearly 66.9% reported growing maize, 53.1% cassava, 31.5% rice, 23.1% cow peas, 16.9% peanuts, 16.7% sweet potatoes, 4.8% butter beans, and other less cultivated crops.

Only 29.1% of the respondents think they produce enough to sell to others. Among those who report selling, the two main products sold are maize (49.9%) and cassava (14.2%). The majority of the maize sold done so in the months of June, July and August. The vast majority of produce is sold by the interviewee herself at a specific market (51.6%) or at no specific market (43.9%).

Table 29: Farm Activity

	Zambézia-wide	95% CI
Grow any crop[b] (n=3467)		
No	9.2%	(6.9, 11.6)
Yes	88.5%	(86.0, 91.1)
No response	2.2%	(1.2, 3.2)
Among growers, households grow (n=2962):		
Maize	66.9%	(60.0, 73.8)
Rice	31.5%	(24.6, 38.4)
Cow pea	23.1%	(18.6, 27.5)
Peanut	16.9%	(12.3, 21.5)
Cassava	53.1%	(46.1, 60.0)
Butter bean	4.8%	(2.2, 7.3)
Sweet potato	16.7%	(12.2, 21.3)
Other	25.2%	(19.5, 30.9)
Among growers, do they produce enough of any crop to sell?[b] (n=2962)		
No	65.2%	(60.3, 70.0)
Yes	29.1%	(24.4, 33.9)
Do not know	0.9%	(0.1, 1.7)
No response	4.8%	(3.2, 6.5)
Among growers who sell crops, households sell (n=718):		
Maize	49.9%	(41.1, 58.7)
Rice	0%	(0.0, 0.0)
Cow pea	5.1%	(2.4, 7.8)
Peanut	8.5%	(2.7, 14.4)
Cassava	14.2%	(8.8, 19.5)
Butter bean	4.0%	(0.6, 7.5)
Sweet potato	0%	(0.0, 0.0)
Other	19.6%	(11.9, 27.3)
Marketing strategies for growers who sell MAIZE during 2009/2010 season (n=290):		
Month(s) during which grower sells majority of MAIZE:		
January	8.1%	(1.8, 14.5)
February	10.6%	(5.6, 15.6)
March	6.3%	(2.6, 10.0)
April	10.3%	(5.6, 14.9)
May	13.7%	(5.5, 21.8)
June	33.4%	(22.3, 44.4)
July	42.3%	(30.8, 53.8)
August	29.5%	(20.2, 38.9)
September	8.9%	(3.8, 14.1)
October	5.5%	(0.8, 10.2)
November	4.9%	(0.8, 9.0)
December	10.1%	(2.7, 17.5)
Main marketing strategy(ies) used to sell MAIZE:		
Sell personally at specific market	51.6%	(43.0, 60.1)
Sell personally at no specific market	43.9%	(34.0, 53.8)
Sell through a federation or forum	2.6%	(0.0, 5.7)
Produce specifically to a single buyer	13.9%	(9.2, 18.5)
Other	4.1%	(0.0, 8.9)

[b] Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

[c] Percentages may sum to greater than 100%.

6 Child Anthropometrics

Measurements of weight and height/length were collected for 667 children (315 boys and 352 girls) under the age of 5 years. Tables 31–33 summarize Zambézian child anthropometrics overall and by sex in reference to standardized measurements developed by the World Health Organization in 2006. WHO provides macros for statistical software packages that calculate the indicators of the attained growth standards (length/height-for-age, weight-for-age, weight-for-length, weight-for-height, and body mass index-for-age). See www.who.int/childgrowth for more information.

Moderate to severe low weight-for-age (underweight) is defined by UNICEF as two standard deviations below the median weight-for-age of the WHO Child Growth Standards. The proportion of children aged 0-60 month in the survey who were moderately or severely underweight was 13.4% (Table 31, Figure 2). The summary data for Sub-Saharan Africa for moderate to severe underweight from the State of the World's Children (SOWC) report was 23%; no SOWC 2010 data was available for moderate and severe underweight for Mozambique (UNICEF, 2010b). In our survey, the proportion of boys who were moderately or severely underweight was greater than the proportion of girls (12.3% versus 14.6%)(Tables 32 and 33).

The proportion of children aged 0-60 months in the survey with moderate or severe stunting (defined by UNICEF as two standard deviations below the median length/height-for-age of the WHO Child Growth Standards) was 39.2% (Table 31, Figure 3). The summary data for moderate and severe stunting from SOWC 2010 was 42% for Sub-Saharan Africa and 44% for Mozambique (UNICEF, 2010b). In our survey, the proportion of boys who were moderately or severely stunted was greater than the proportion of girls (38.3% versus 40%)(Tables 32 and 33).

The proportion of children aged 0-60 months in the survey with moderate or severe wasting (defined by UNICEF as two standard deviations below the median weight-for-length/height of the WHO Child Growth Standards [2006]) was 6.2% (Table 31, Figure 4). The summary data for moderate and severe wasting from SOWC 2010 was 10% for Sub-Saharan Africa and 4% for Mozambique (UNICEF, 2010b). The proportion of boys who were moderately or severely wasted was greater than the proportion of girls (8.2% versus 6.5%)(Tables 32 and 33).

Table 30 summarizes child anthropometry from various previous surveys in Zambézia; results are similar across surveys.

Table 30: Child anthropometric results from multiple surveys in Zambézia

	All children under 5 yrs					
	Weight-for-Age (underweight)		Height/Length-for-age (chronic malnutrition)		Weight-for-length/height (acute malnutrition)	
	< -3 SD %	< -2 SD %	< -3 SD %	< -2 SD %	< -3 SD %	< -2 SD %
DHS 2003	8.9	26.9	24.6	47.3	0.8	5.2
MICS 2008	5.1	20.6	18.0	45.7	1.4	4.9
OCLUVELA 2008	4.6	23.7	17.3	36.3	2.0	8.7
Ogumaniha 2010	8.4	13.4	19.9	39.2	2.3	6.2

Table 31: Child Anthropometrics

	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)	Mean	SD
Weight-for-age							
6-60	667	8.4	(8.2, 8.6)	13.4	(13.2, 13.7)	-0.32	1.55
6-11	91	17.6	(16.8, 18.3)	17.9	(17.1, 18.6)	-0.13	1.78
12-23	104	6.6	(6.1, 7)	12.9	(12.2, 13.5)	-0.42	1.59
24-35	128	3.7	(3.4, 4)	6.8	(6.4, 7.2)	-0.05	1.57
36-47	215	6.7	(6.4, 7)	12.9	(12.4, 13.3)	-0.12	1.4
48-60	129	10.4	(9.9, 10.9)	17.2	(16.7, 17.8)	-0.87	1.43
Length/height-for-age							
6-60	667	19.9	(19.6, 20.2)	39.2	(38.8, 39.5)	-1.63	1.77
6-11	91	8	(7.5, 8.5)	27.1	(26.2, 27.9)	-1.28	1.41
12-23	104	16.1	(15.5, 16.8)	36.4	(35.5, 37.3)	-1.6	1.57
24-35	128	23.1	(22.4, 23.8)	39.3	(38.5, 40.1)	-1.39	2.08
36-47	215	15.7	(15.2, 16.2)	39.8	(39.2, 40.4)	-1.57	1.66
48-60	129	33.3	(32.6, 34)	47.6	(46.8, 48.3)	-2.13	1.87
Weight-for-length/height							
6-60	667	2.3	(2.2, 2.4)	7.4	(7.2, 7.6)	0.83	1.76
6-11	91	9.2	(8.6, 9.8)	14.1	(13.4, 14.7)	0.87	2.19
12-23	104	2.3	(2, 2.6)	6.2	(5.8, 6.7)	0.48	1.74
24-35	128	1	(0.8, 1.1)	5.9	(5.5, 6.3)	0.88	1.79
36-47	215	1.4	(1.3, 1.6)	6.8	(6.5, 7.2)	1.1	1.68
48-60	129	0.5	(0.4, 0.6)	5.9	(5.5, 6.3)	0.64	1.49
BMI-for-age							
6-60	667	2.6	(2.5, 2.7)	5.6	(5.5, 5.8)	1	1.81
6-11	91	10.3	(9.7, 10.9)	14.1	(13.4, 14.7)	0.82	2.28
12-23	104	2.3	(2, 2.6)	6.2	(5.8, 6.7)	0.73	1.8
24-35	128	1.9	(1.7, 2.1)	3.9	(3.6, 4.3)	1.04	1.82
36-47	215	1.2	(1.1, 1.4)	4.8	(4.5, 5.1)	1.29	1.73
48-60	129	0.5	(0.4, 0.6)	2.6	(2.3, 2.8)	0.83	1.49

[a] Reference standards and analysis programs were developed by the World Health Organization in 2006. These programs perform weighted estimation, with each child being weighted by the inverse of its sampling probability.

Table 32: Male Child Anthropometrics

	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)	Mean	SD
Weight-for-age for boys							
6-60	315	8.9	(8.7, 9.2)	12.3	(12, 12.7)	-0.33	1.57
6-12	34	10.5	(9.5, 11.5)	11.3	(10.2, 12.3)	-0.1	1.62
12-23	56	5.4	(4.8, 5.9)	9.3	(8.6, 9.9)	-0.23	1.63
24-35	75	5.3	(4.9, 5.8)	5.7	(5.2, 6.2)	-0.09	1.71
36-47	102	12.9	(12.3, 13.5)	17.7	(17, 18.4)	-0.49	1.33
48-60	48	9.3	(8.6, 10.1)	15	(14.1, 15.9)	-0.59	1.63
Length/height-for-age for boys							
6-60	315	19.4	(19, 19.8)	38.3	(37.8, 38.8)	-1.63	1.83
6-12	34	3.2	(2.7, 3.8)	26.2	(24.8, 27.6)	-1.13	1.27
12-23	56	16.2	(15.3, 17)	31.8	(30.7, 32.9)	-1.59	1.54
24-35	75	25.6	(24.7, 26.5)	40.6	(39.5, 41.6)	-1.4	2.26
36-47	102	14.5	(13.9, 15.2)	39.5	(38.6, 40.3)	-1.73	1.59
48-60	48	32.7	(31.5, 33.8)	46.9	(45.7, 48.1)	-2.04	2.04
Weight-for-length/height for boys							
6-60	315	2.4	(2.2, 2.5)	8.2	(7.9, 8.4)	0.77	1.79
6-12	34	8.9	(8, 9.8)	9.5	(8.5, 10.4)	0.74	2.11
12-23	56	1.7	(1.4, 2)	5.7	(5.2, 6.3)	0.71	1.78
24-35	75	1.4	(1.2, 1.7)	7.5	(6.9, 8.1)	0.84	1.83
36-47	102	2.8	(2.5, 3)	11.7	(11.2, 12.3)	0.67	1.76
48-60	48	0	–	4.2	(3.7, 4.7)	0.94	1.59
BMI-for-age for boys							
6-60	315	2.2	(2.1, 2.4)	5.5	(5.2, 5.7)	0.97	1.82
6-12	34	8.9	(8, 9.8)	9.5	(8.5, 10.4)	0.72	2.15
12-23	56	1.7	(1.4, 2)	5.7	(5.2, 6.3)	0.96	1.83
24-35	75	1.4	(1.1, 1.6)	4.4	(4, 4.8)	0.94	1.79
36-47	102	2.3	(2.1, 2.6)	7.9	(7.4, 8.3)	0.92	1.86
48-60	48	0	–	0	–	1.22	1.54

[a] Reference standards for boys and analysis programs were developed by the World Health Organization in 2006. These programs perform weighted estimation, with each child being weighted by the inverse of its sampling probability.

Table 33: Female Child Anthropometrics

	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)	Mean	SD
Weight-for-age for girls							
6-60	352	7.9	(7.6, 8.1)	14.6	(14.2, 14.9)	-0.3	1.53
6-11	57	21.6	(20.6, 22.6)	21.7	(20.7, 22.7)	-0.15	1.87
12-23	48	8.5	(7.7, 9.4)	18.9	(17.7, 20.1)	-0.74	1.46
24-35	53	0.6	(0.4, 0.9)	8.9	(8.1, 9.7)	0.03	1.25
36-47	113	0	–	7.6	(7.1, 8.1)	0.29	1.35
48-60	81	11.1	(10.5, 11.7)	18.8	(18, 19.6)	-1.06	1.24
Length/height-for-age for girls							
6-60	352	20.4	(20, 20.8)	40	(39.5, 40.5)	-1.63	1.71
6-11	57	10.8	(10, 11.5)	27.5	(26.4, 28.6)	-1.36	1.47
12-23	48	16.1	(15, 17.2)	44	(42.5, 45.6)	-1.63	1.61
24-35	53	18.5	(17.4, 19.6)	36.9	(35.5, 38.3)	-1.36	1.71
36-47	113	17	(16.3, 17.7)	40.2	(39.3, 41.1)	-1.4	1.73
48-60	81	33.7	(32.8, 34.7)	48	(47, 49)	-2.2	1.74
Weight-for-length/height for girls							
6-60	352	2.3	(2.1, 2.5)	6.5	(6.3, 6.8)	0.9	1.73
6-11	57	9.4	(8.7, 10.1)	16.7	(15.8, 17.6)	0.95	2.24
12-23	48	3.3	(2.8, 3.9)	7.1	(6.3, 7.9)	0.09	1.6
24-35	53	0.2	(0.1, 0.3)	3.1	(2.6, 3.6)	0.97	1.71
36-47	113	0	–	1.5	(1.3, 1.8)	1.55	1.45
48-60	81	0.9	(0.7, 1)	7	(6.5, 7.6)	0.43	1.37
BMI-for-age for girls							
6-60	352	3	(2.8, 3.1)	5.8	(5.6, 6.1)	1.03	1.79
6-11	57	11.1	(10.3, 11.9)	16.7	(15.8, 17.6)	0.87	2.35
12-23	48	3.3	(2.8, 3.9)	7.1	(6.3, 7.9)	0.33	1.67
24-35	53	2.9	(2.4, 3.3)	3.1	(2.6, 3.6)	1.23	1.86
36-47	113	0	–	1.5	(1.3, 1.8)	1.69	1.47
48-60	81	0.9	(0.7, 1)	4.4	(4, 4.8)	0.56	1.39

[a] Reference standards for girls and analysis programs were developed by the World Health Organization in 2006. These programs perform weighted estimation, with each child being weighted by the inverse of its sampling probability.

Figure 2: Weight-for-age Z-score distribution compared to reference curve – ages 0-60 months

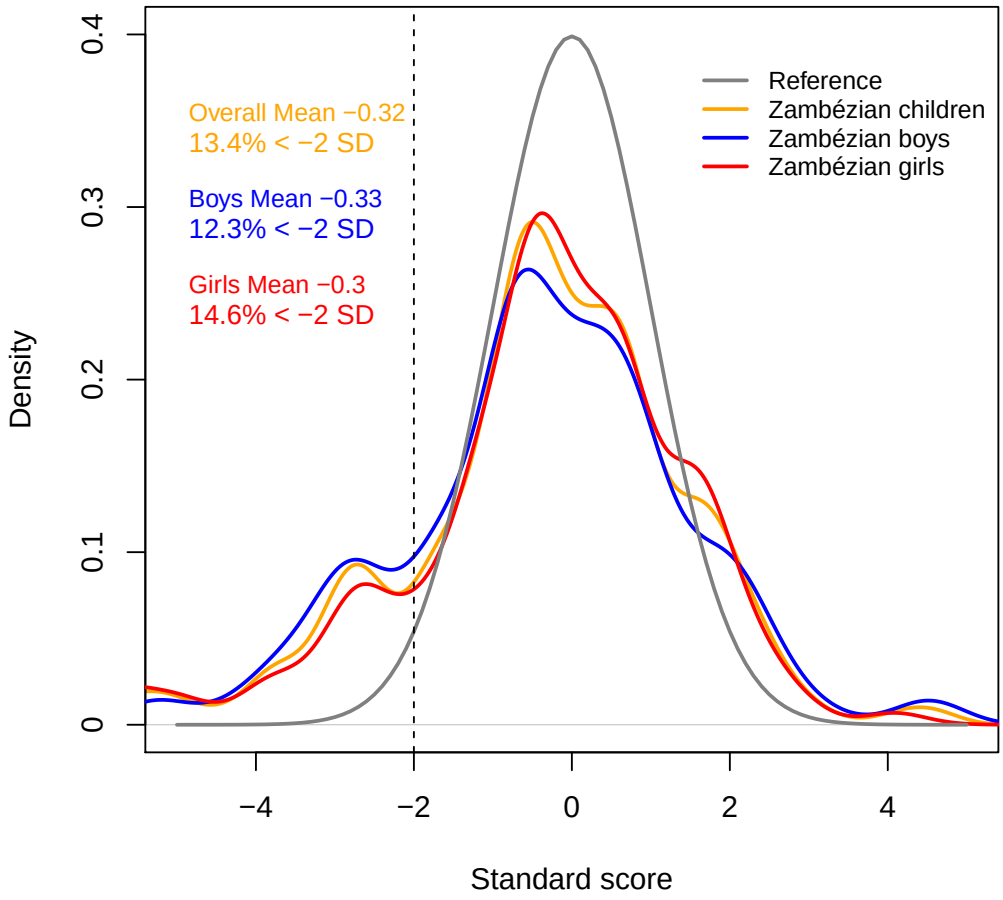


Figure 3: Length/height-for-age Z-score distribution compared to reference curve – ages 0-60 months

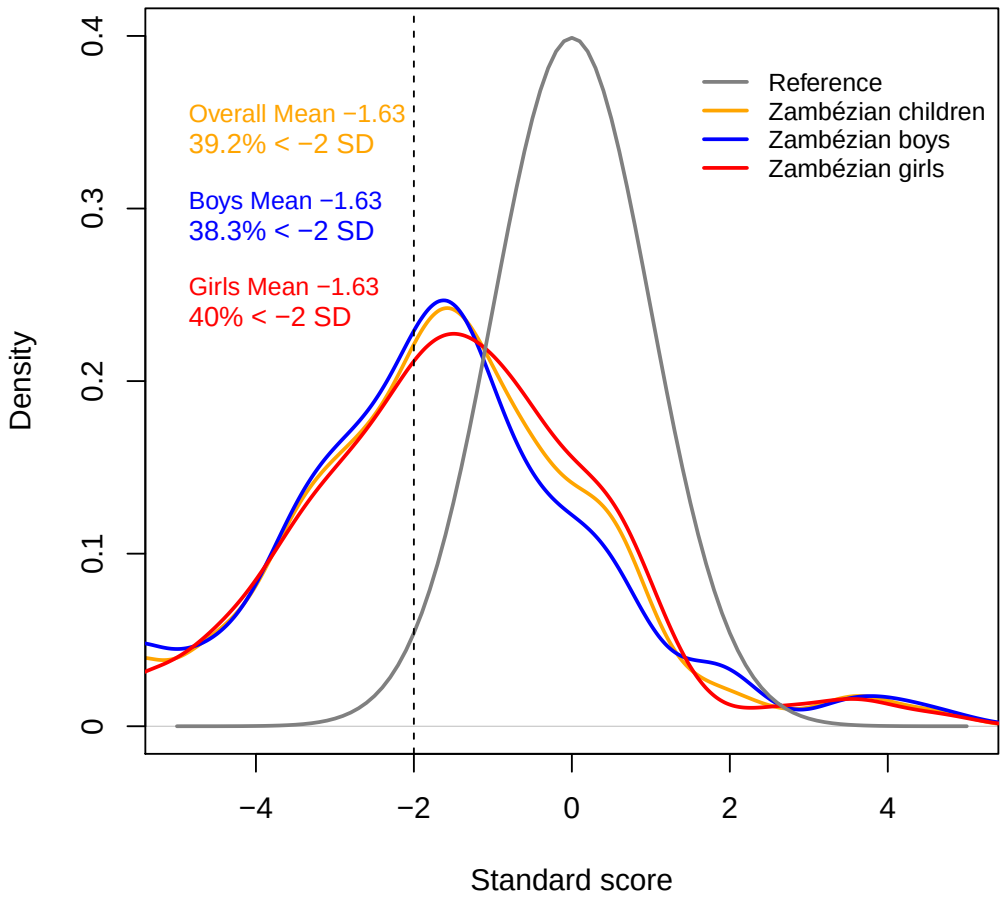


Figure 4: Weight-for-height Z-score distribution compared to reference curve – ages 0-60 months

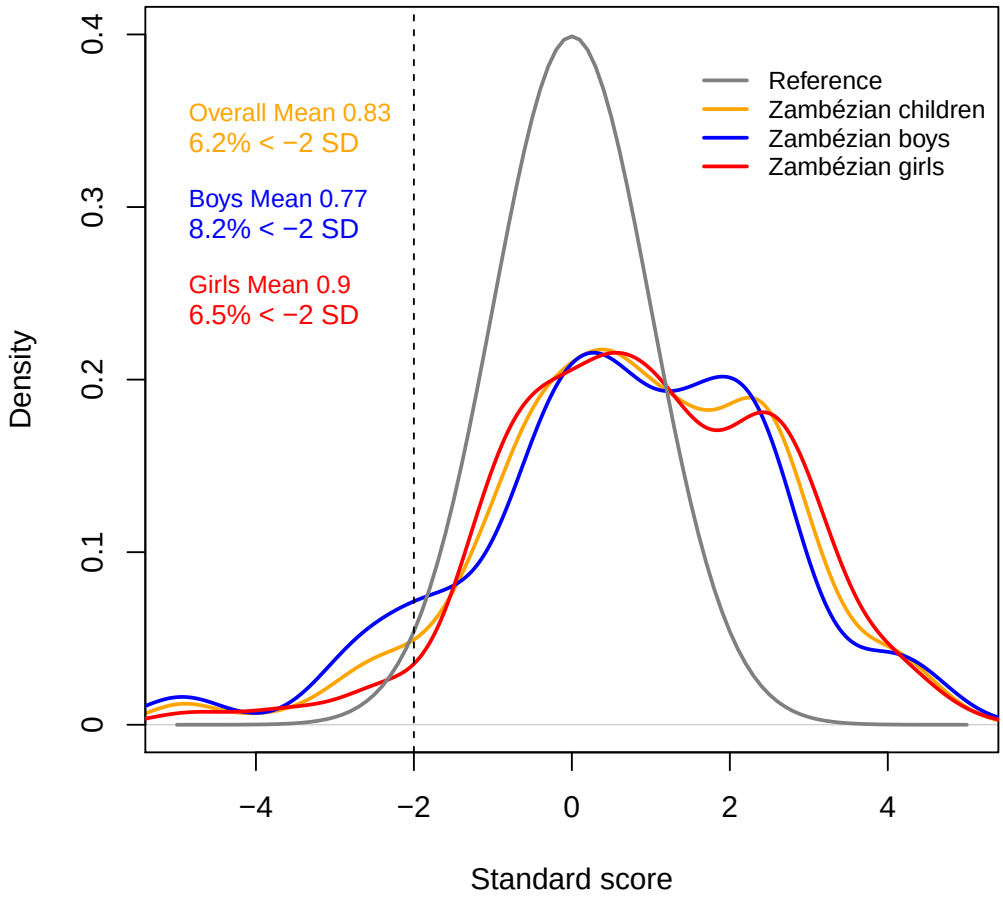
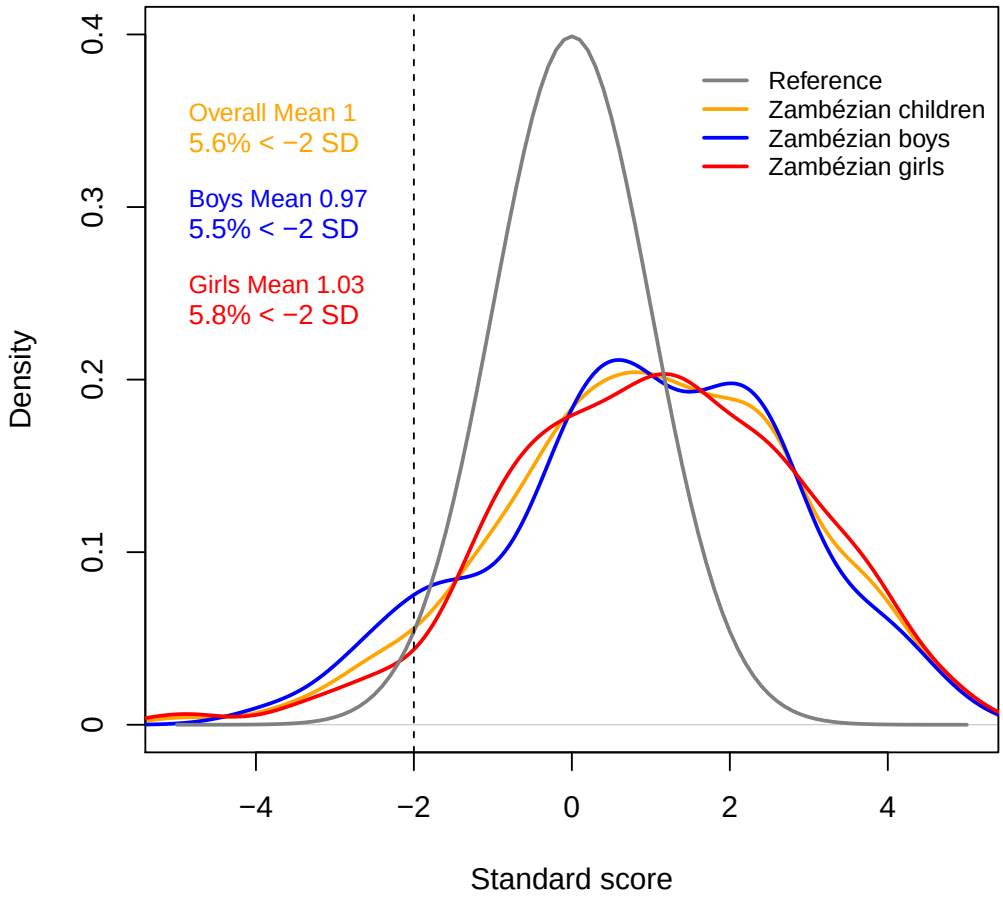


Figure 5: BMI-for-height Z-score distribution compared to reference curve – ages 0-60 months



7 Limitations

Several limitations exist in the survey data. First, the random selection of enumeration areas resulted in a province-wide sample that did not include all districts; the districts of Pebane, Namarroi and Inhassunge were not included in the sample drawn. The enumeration areas were chosen with a selection probability proportional to population size, and it just so happens that no enumeration areas were selected for those three districts. Since the sample was not designed to provide estimates at a district level, but only at the provincial level, this was expected to happen. For the phase two sample, the districts chosen were Namacurra, Alto Molócuè and Morrumbala. These districts were chosen deliberately with partner input because many communities in those districts were recipients of Ogumaniha program activities, and because of their size also provided a good spread of the quantity of program activities. The consortium also felt that the three districts were located in settings representative of the coast, the Zambéze valley, and the highlands, providing enough variation in climate and geography. An unintended limitation is that the three chosen phase II districts were all ones where World Vision serves as the main coordinating partner for the district, and none are where ADRA serves as the district coordinator.

Despite every effort to adapt questions to the local context during the pilot phase of the study, certain questions were still difficult to obtain reliable, valuable information. Social desirability bias–or the interest in survey participants to provide the answers they believe surveyors wish to hear rather than the ones that reflect their actual knowledge, attitudes, beliefs and access to services–likely led to the over-reporting of satisfaction with services and underreporting of problems at health facilities. For example, survey teams reported that participants were reluctant to provide negative information about health service provision for fear of potential repercussions next time they attend a health facility. Also, teams reported that participants were reticent in providing information on the availability of income, fearing that it might negatively impact their access to external support.

Interviewers reported that in many cases the women did not know the exact age of their children. Where possible, age of children under 5 years of age was determined using vaccination cards. In other cases, ages were estimated based on information provided by the women interviewed, such as "The child was born at the time of the bean crop". Estimations of child age will affect the sensitivity of anthropometric measures, particularly for younger children. Additionally, rough field conditions affected the precisions of the instruments, although they were consistently calibrated prior to use.

It is possible that orphans and vulnerable children (OVC) assistance was provided to households without any OVC, or that some households had OVC residing at one point but not at the time of the survey, which might account for the low proportion of households reporting receiving support for the orphans in their homes. It is also possible that the question could have been worded differently to capture whether children who had lost at least one biological parent were living in the household, and whether families were receiving support for one or more children in the household, to better capture the information we sought. We did not explore the conceptualization of orphanhood in the Zambézian context.

Questions on sources of advice sought for a child displaying febrile, diarrheal, and respiratory symptoms showed a very high proportion seeking advice from hospitals and health centers. Upon investigation, survey teams reported that individuals in the community with ties to health facilities, such as activistas, APEs (basic polyvalent agents), and volunteers, were frequently reported as sources of information but were not a response option and therefore coded as either hospital or health facility. The information on sources of advice therefore overestimates the proportion seeking advice at health facilities.

Response categories for certain questions related to households did not sufficiently capture response possibilities. For example, questions on water source listed "well", but not whether the well was open or

capped; sources of light included flashlights but not oil and kerosene lamps. These limitations reduce the quality of information available on households.

The modified version of the Household Food Insecurity and Access Score (HFIAS) had an error in the skip logic on the mobile data collection device that rendered the scale unusable; the only valid indicator of the list we were able to analyze and report uponw was the availability of food in the past four weeks in the household.

8 Next Steps

Several steps will be taken following the completion of the baseline survey. First, results from Phase I will be shared with all Ogumaniha consortium members and their partners in a forum event to be held in Quelimane in late October 2010. The purpose of the forum will be to disseminate findings, determine how project activities may need to be realigned or reconceptualized based on the findings, and to identify areas for further in-depth examination in order to fine tune project activities to meet the needs identified. Summary information from Phase I should also be disseminated through Ogumaniha District Coordinators to District Administrators and local leaders, to help with local planning. Health-related data will be shared with the Provincial Health Directorate as requested in order to help with prioritization of government activities. One assessment focusing on follow-up of one or more issues discovered through the survey and other M&E activities will be designed and conducted in Year 2 of Ogumaniha implementation, based on the discussions from the partner forum.

Phase II findings will next be analyzed and disseminated, to provide concrete information on the three focus districts for the Ogumaniha project. The Phase II findings will provide further guidance on programmatic areas needing particular attention during project implementation. Both Phase I and Phase II data will be used together to review project targets defined in the Ogumaniha Project Monitoring Plan, revising them should the need arise.

Lessons learned from the data collection period will be gathered during a full-day meeting with all survey teams. The lessons will be summarized in a separate document and will guide the implementation of the final, medium-term impact evaluation to be conducted at the end of Ogumaniha's project period. Improvements may be made to the survey instrument to ensure that it captures information of interest, keeping in mind that substantial revisions will limit the comparability of data between the baseline data collection and the end-of-project evaluation.

Separate secondary analyses will be conducted on both Phase I and Phase II data. One of the analyses will assess the poverty levels of the community based on the Oxford Poverty and Human Development Initiative (OPHI) multidimensional definition of poverty. Additional analyses will emerge from the forum discussions as well as from a meeting of all those involved in the development of the survey instrument during a 2-day meeting to be held at Vanderbilt University in mid-November.

References

Aliago, A. and Ruilin, R. (2006). Optimal sample sizes for two-stage cluster sampling in demographic and health surveys. *Demographic and Health Research*, 30.

Alkire, S. and Santos, M. E. (2010). Acute multidimensional poverty: A new index for developing countries. *OPHI Working paper*, 38.

Bennet, S., Woods, T., Liyanage, W. M., and Smith, D. L. (1991). A simplified general method for cluster-sample surveys of health in developing countries. *World Health Statistics Quarterly*, 44.

Buiya, A., Mahmood, S. S., Rana, A. K. M. M., Wahed, T., Ahmed, S. M., and Cowdhury, A. M. R. (2007). A multidimensional approach to measure poverty in rural Bangladesh. *J health population Nutrition*, pages 131–145.

ChildInfo (2010). http://www.childinfo.org/mics4_questionnaire.html. *Monitoring the situation of women and children.*

Coates, J., Swindale, A., and Bilinsky, P. (2007). Household food insecurity access scale (HFIAS) for measurement of food access: Indicator guide version 3. *Food and Nutrition Technical Assistance Project*, Washington DC.

Cochran, W. G. (1977). *Sampling Techniques.* John Wiley & Sons.

DHS (2003). Demographic and health survey results: Mozambique.

DHS (2010). Demographic and health survey 5: Model household questionnaire (modified).

DHS (July 2006). Model questionnaire with commentary. In *MEASURE DHS Basic Documentation Number 2 ORC Macro.* DHS, Calverton, Maryland.

Dimagi, Inc. (2010). http://www.dimagi.com. *Charlestown, MA.*

eMap International (2010). http://www.emap-int.com. *Denver, CO.*

FAO Nutrition and Consumer Protection Division (2008). Guidelines for measuring household and individual dietary diversity.

Government of South Africa (2007). Community survey.

Grant, M. J. (2008). Children's school participation and HIV/AIDS in rural Malawi. the role of parental knowledge and perceptions. *Demographic Research*, 19(45):1603–1634.

INE (2007). Mozambican Census Bureau.

Lemeshow, S., Tserkovnyi, A. G., Tulloch, J. L., Dowd, J. E., Lwanga, S. K., and Keja, J. (1985). A computer simulation of the EPI survey strategy. *Int J Epidemiol*, 14(3):473–81.

Levy, P. S. and Lemeshow, S. (2008). *Sampling of populations: Methods and applications. 4th ed.* Hoboken, NJ: John Wiley & Sons.

Lindelow, M., Ward, P., and Zorzi, N. (2004). Primary health care in Mozambique: Service delivery in a complex hierarchy. In *Africa Region Human Development Working Paper Series.* World Bank, Washington DC.

Lockheed, M. E., Fuller, B., and Nyirongo, R. (1989). Family effects on student's achievement in Thailand and Malawi. *Sociology and Education*, 62(4):239–256.

MICS (2008). Multiple indicator cluster survey results: Mozambique.

MISAU (2002 and 2008). Relatório sobre a revisão dos dados de vigilância epidemiológica do HIV.

MISAU (2009). Inquérito Nacional de Prevalência, Riscos Comportamentais e Informação sobre o HIV e SIDA em Moçambique.

O'Donnell, O., van Doorslaer, E., Wagstaff, A., and Lindelow, M. (2008). *Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and Their Implementation.* World Bank, Washington DC.

Oxford Poverty and Human Development Initiative (2010). Missing dimensions of poverty data: a proposal for international comparable indicators.

PARPA II (2006). Plano de acção para a redução da pobreza absoluta 2006-2009.

Population Council (2003). Brazilian truck driver stigma study.

Pradhan, M. and Ravallion, M. (2000). Measuring poverty using qualitative perceptions of consumption adequacy. *Review of Economics and Statistics*, 82(3):462–471.

Pulerwitz, J. and Barker, G. (2007). Measuring attitudes towards gender norms among young men in Brazil: Development and psychometric evaluation of the GEM scale. *Men and Masculinities*, pages 322–338.

Sen, A. (1999). *Development as Freedom*. Oxford University Press, Oxford.

Tirivayi, N., Koethe, J., and Groot, W. (2009). Analysis of the clinical and welfare effects of a household food distribution program to HIV-affected families in Lusaka, Zambia. *UNAIDS (in preparation)*, Washington DC.

UNICEF (2010a). Multiple indicator cluster surveys.

UNICEF (2010b). The state of the World's children.

Vaux, A., Phillips, J., and Holly, L. (1986). The social support appraisals (SS-A) scale: Studies of reliability and validity. *American Journal of Community Psychology*, 14(2).

WHO (1997). WHOQOL: Measuring quality of life. *WHOQOL Group: WHO Programme on Mental Health*, WHO/MSA/MNH/PSF/97.4.

WHO (1998). Introducing the WHOQOL instruments. *Department of Mental Health and Substance Dependence*.

WHO (2002). WHOQOL-HIV instrument, in scoring and coding for the WHOQOL-HIV instruments. *Mental Health: Evidence and Research Department of Mental Health and Substance Dependence*.

WHO expert committee (1995). Physical status: The use and interpretation of anthropometry. *WHO Technical Report Series*, 854.

Wilkinson, G. S. (1993). *WRAT: Wide Range Achievement Test Administration Manual*. Wide Range, Inc, Wilmington, DE.

Wold, B. K. (2004). A sustainable household survey based poverty monitoring system. *Norway Development Cooperation*.

World Bank (2007). Pesquisa de orcamentos familiares.