COMMUNITY-BASED LAY-WORKER FEASIBILITY CLUSTER RANDOMIZED CONTROLLED TRIAL FOR STRONG FAMILIES, THRIVING CHILDREN, SUGIRA MURYANGO

Baseline Data Collection Report

September 2018

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DATA | RESEARCH | ADVISORY

Table of Contents

Table of Figures

Appendices

INTRODUCTION

Project Overview and Background

This study is a cluster randomized controlled trial of the Strong Families, Thriving Children *Sugira Muryango* intervention delivered by community-based lay-workers trained and supervised by FXB Rwanda. The study was designed as a quantitative survey conducted in three districts of Rwanda (Nyanza, Ngoma, Rubavu) with 1,040 households and qualitative interviews with a subset of 40 caregivers. *Sugira Muryango* will be evaluated as a supplementary intervention for households participating in Vision Umurenge 2020 Programme (VUP) Public Works. Data was collected immediately prior to the intervention, and will be collected again immediately following the intervention and at one year following the intervention. The project will evaluate the impact of the *Sugira Muryango* intervention for all households participating in the study as well as for VUP Classic Public Works and VUP Expanded Public Works separately.

Project Objectives

The main objective of this study is to determine whether the *Sugira Muryango* intervention, delivered by community-based lay-workers, is effective in improving early childhood development (ECD) outcomes and supporting vulnerable families delivered by community-based lay-workers. This will be measured through surveys with the primary caregiver and their intimate partner when applicable, and through child development assessments and anthropometric measurements.

This study will be used to support the design of policy aimed at strengthening Rwanda's most vulnerable families.

The data collected will be used by the Government of Rwanda and the World Bank to test the sustainability and scalability of *Sugira Muryango* when delivered by community-based lay-workers and linked to VUP Public Works programming.

ROLES AND RESPONSIBILITIES

Throughout the design process and the implementation of baseline data collection, Laterite worked very closely with the team from Boston College to operationalize the study design.

Boston College

Boston College's responsibilities included but were not limited to:

Obtaining research permits: Boston College was responsible for obtaining approvals to conduct the study from Rwanda National Ethics Committee (RNEC) and the National Institute of Statistics of Rwanda (NISR).

Sampling: Boston College lead the design of this cluster randomized control study, including developing the sampling strategy.

Designing research instruments: Boston College designed the research instruments and consent forms and completed initial translations. Ahead of data collection, Boston College approved the final versions of the instruments.

Training: Boston College designed and led field team training on the MDAT.

Data collection: When Laterite identified potential cases of severe abuse, suicidality, or malnutrition, Boston College and FXB were responsible for assessing severity and making referrals for additional services or treatment.

LATERITE

Laterite's responsibilities included:

Obtaining approvals from local authorities: After receiving approvals from the RNEC and NISR, Laterite was responsible for informing and obtaining clearance for conducting the study from local authorities at the district, sector, cell, and village levels.

Sampling: Laterite operationalized the sampling strategy by collecting updated VUP participant lists, conducting village listing and household rostering to identify households that were eligible to participate in the study, randomly selecting households based on Boston College's study design, and enrolling the selected households in the study.

Reviewing, coding, and testing research instruments: Laterite reviewed all survey instruments and made recommendations regarding appropriate translations, questions to omit, and logic patterns. Once the instruments were set, Laterite programmed them into SurveyCTO for electronic data collection. Enumerators and Laterite researchers tested multiple iterations of the surveys to check functionality and estimate the time required to administer each instrument.

Recruitment and training of field staff: Laterite recruited a team of data collectors from its roster of qualified personnel. Laterite developed and delivered training on all surveys completed at the

household and on taking and recording anthropometric measurements. Laterite also included in its training sessions an overview of the project, Laterite policies, and research ethics.

Data collection: Laterite led all data collection activities, including developing field plans, scheduling appointments, conducting interviews and assessments, managing enumerator teams, and addressing quality concerns while in the field.

Data cleaning, monitoring, and auditing: Throughout data collection, Laterite monitored the quality of data, audited recordings of a random subset of interviews, and worked with the team in the field to resolve duplicates or discrepancies. With this report, Laterite submitted a cleaned dataset to Boston College.

METHODOLOGY

Design and Sampling

Details regarding the methodology of this cluster randomized controlled trial are included in the Field Preparation Report dated June 2018.

Figure 1 and Figure 2 show the target number of clusters and households enrolled in the trial. Because of the timing of cluster allocation to treatment assignment and cluster failure, there are an uneven number of Expanded Public Works clusters and households in the treatment and control arms of the trial and in the pooled analysis. Additional details on the process of cluster selection, treatment allocation, and the selection of additional clusters are described in detail in the field preparation report.

Figure 1. Number of Clusters Allocated to Treatment and Control

	Control	Treatment	Total
Classic PW	75 clusters	75 clusters	150 clusters
Expanded PW	39 clusters	47 clusters	86 clusters
Pooled	98 clusters	100 clusters	198 clusters

Figure 2. Number of Households Allocated to Treatment and Control

	Control	Treatment	Total
Classic PW	375 households	375 households	750 households
Expanded PW	138 households	174 households	312 households
Pooled	513 households	549 households	1062 households

Research Instruments

Quantitative data collection utilized the following survey instruments which were broadly divided according to the location where the surveys were administered. Boston College designed and translated the research instruments, which Laterite reviewed for appropriateness and effectiveness. Laterite coded all surveys for deployment using SurveyCTO. Ahead of data collection, Laterite shared the coded final research instruments in Excel format and enabled Boston College with electronic access to the surveys on SurveyCTO. The research team from Boston College approved the final instruments.

Surveys at the Household

The following surveys were administered at the respondent's house.

- **Report on the Child**: This survey was completed by the primary caregiver for and with each eligible child in the study household. It includes: questions for the caregiver regarding child feeding practices, food security, child health, and child discipline; the Ages and Stages Questionnaire (ASQ)-3; the Home Observation for Measurement of the Environment (HOME); and the Observation of Mother Child Interaction (OMCI.)
- **Caregiver Report on Household**: This survey was completed by the primary caregiver in each study household or by his or her intimate partner and includes modules regarding the family composition, household assets, social protection, VUP participation, finances, and food security.
- **Caregiver Report on Self**: This survey was completed by each primary caregiver in the study household. If the primary caregiver had an intimate partner, the Caregiver Report on Self was completed by the intimate partner as well. Intimate partner surveys were not considered mandatory for household completion, but every attempt was made to complete this survey with both partners when applicable. The survey includes modules regarding health, disability, parenting and co-parenting, the family unit, early childhood development knowledge, caregiver mental health, caregiver alcohol use, daily hardships, and intimate partner violence.

MDAT and Anthropometric Surveys

- **Malawi Development Assessment Tool (MDAT)**: This observation-based assessment was completed by each eligible child in the study household.
- **Child anthropometric measurements**: Measurements of weight, height or length depending on age, and mid-upper arm circumference (MUAC) were taken for each eligible child in the study household.

FIELD TEAM

Recruitment and Profile of Team Members

Laterite maintains a pool of qualified personnel to act as field team members for quantitative and qualitative data collection projects. In order to qualify for field enumeration work, individuals must pass a rigorous testing process which evaluates logic, problem solving, and, most importantly, communication skills. The interview process includes an Excel test, a written test, and a situational face-to-face interview. Successful candidates are added to the Laterite roster. Laterite selected data collectors for this study from this roster of qualified candidates. Below is a description of the profiles of the field staff who worked on this project:

Field Supervisors

Field supervisors are experienced members of the Laterite team who oversee data collection activities and manage both field coordinators and enumerators.

Field Coordinators

Field coordinators are ground-level supervisors who lead small teams of enumerators while conducting data collection themselves. They coordinate logistics for their teams and carefully monitor the team's daily data uploading.

Enumerators

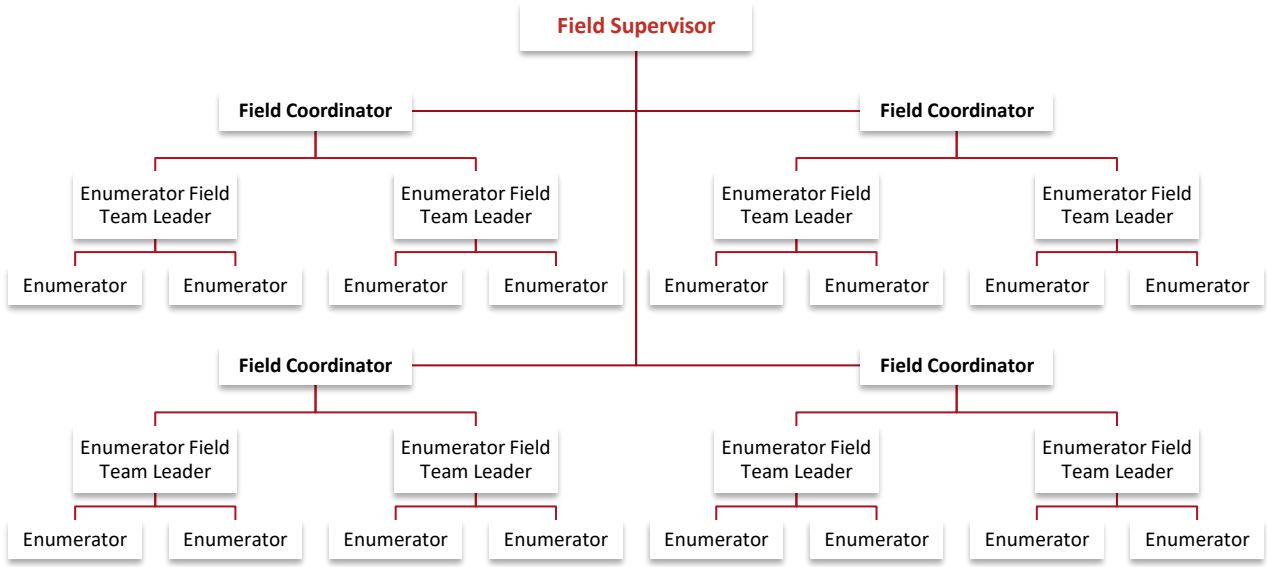
Enumerators are data collection specialists who conduct in-home and centralized interviews and assessments with adults and children in study households. Among groups of four enumerator, one was designated the field team leader to coordinate group logistics and liaise with the field coordinator.

Field Team Structure

Surveys at the Household Field Team

The household survey field team comprised 24 enumerators divided into eight sub-teams of three enumerators each. Each sub-team was led by an enumerator field team leader and field coordinators oversaw two sub-teams of three enumerators each. One field supervisor managed the team completing the surveys at the household, coordinated all data collection activities, and reported directly to the Data Manager.

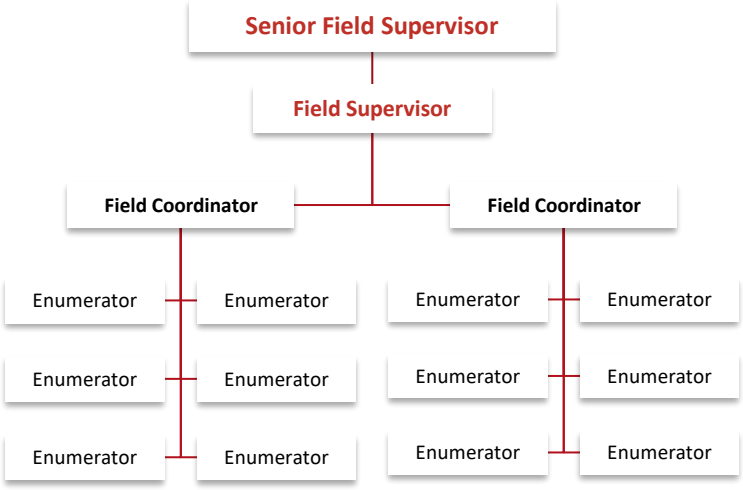
Figure 3. Non-MDAT Field Team Structure



MDAT and Anthropometrics Field Team

In each district, the MDAT and anthropometrics field team consisted of 14 enumerators divided into two field teams of six enumerators and led by a field coordinator. The enumerators and field coordinators shared responsibilities of conducting MDAT assessments, taking anthropometric measurements, and conducting data entry. One of Laterite's full-time senior field supervisors in coordination with the field supervisor managed all team activities.

Figure 4. MDAT and Anthropometrics Field Team Structure



Project Management

Amani Ntakirutimana, Data Manager at Laterite Rwanda, managed all data collection activities and field staff for this project and was embedded with the field team for the entirety of baseline data collection. Amani is one of the most experienced field researchers in Rwanda and specializes in large-scale data collection projects involving complex logistics.

FIELD PLAN AND PROTOCOLS

Informed Consent

Before enrolling eligible households in the study, Laterite enumerators sought informed consent from participants during field preparation and again prior to baseline data collection. Caregivers consented both themselves and their children.

The consent form, provided by Boston College, included the following information:

- Subject and purpose of the research;
- How participants were selected;
- That personal information collected would be used only for study purposes and would remain confidential;
- The type of questions to be asked and the estimated time to complete the surveys;
- Study contact details in case of questions or concerns; and
- That participation is voluntary and that participants may withdraw at any time.

Enumerators read aloud the consent form in Kinyarwanda in case participants were not literate. The forms were signed or, when this was not possible, a thumbprint was given in lieu of a signature.

Laterite and the participant each kept a signed copy of the consent form. Laterite stores the consent forms at our main office in Kigali.

Replacement Strategy

The field team attempted to contact each study household three times: once via phone call prior to visiting and then two attempts in-person. If a household could not be contacted following two in-person attempts or declined further participation in the FSI study, the field supervisor was contacted for the name of a replacement household and the reason for replacement was recorded.

In the case that a Classic Public Works household required replacement, the first replacement household on the replacement list was contacted. If this household was unavailable, the next replacement household was contacted, and so forth. In the case that an Expanded Public Works household required replacement, the household was dropped from the study since all eligible Expanded Public Works were enrolled so no replacement households were available. Further details regarding the creation of household replacement lists can be found in the Field Preparation Report.

Both the field and research teams coordinated and tracked study dropout and replacement households to ensure that dropout and replacements were minimized.

Adverse Event and Risk of Harm Reporting

An adverse event is any occurrence observed during research which suggests that a participant may be at risk for, or have experienced physical, mental or sexual harm. This information may be directly reported by the participant or may be observed, e.g., bruising as a sign of physical abuse. Adverse events identified by the field team were managed according to a detailed risk of harm protocol

developed by Boston College, which guided the field team through the appropriate response to different risks of harm.

Specific survey questions automatically triggered action according the risk of harm protocol. In these cases, enumerators were required to enter additional information regarding participant risk and action taken in the field. These flags were monitored in real time by field supervisors and twice weekly by the research team to ensure that the protocol was followed appropriately and suspected cases of harm were escalated. All risk of harm flags and their responses were reported to Boston College weekly.

DATA COLLECTION TRAINING

Surveys at the Household

Data collection training began on January 29, 2018 and concluded on February 9, 2018. Training for surveys completed at the household included an overview of the study's objectives and methodology, sampling and replacement strategies, research ethics, the field team's responsibilities, adverse event reporting and the risk of harm protocol, and a thorough review of the survey instruments. The review of survey instruments included presentations outlining:

- The Report on the Child survey, including:
  - All ASQ-3 surveys for 6- to 36-month-old children, with pictorial representations of milestones to ensure field team understanding;
  - The HOME survey with detailed instructions regarding appropriate scoring;
  - The OMCI tool with practice videos;
- The Caregiver Report on the Household survey; and
- The Caregiver Report on the Self survey.

At the end of training, the teams piloted all the survey instrument in the field on February 16, 2018. Due to a delay in the baseline data collection timeline to accommodate Rwanda's Genocide Memorial Week, the team attended three days of refresher training from April 18 to April 20, 2018 prior to field deployment.

Field training was led by Amani Ntakirutimana, Data Manager at Laterite Rwanda, and presentations were adapted or created by Melissa Sutton, MD, Global Health Research Consultant at Laterite Rwanda.

MDAT and Anthropometrics Surveys

Boston College developed and led the training for Laterite field team on the administration and scoring of the MDAT. The training began on January 22, 2018 and concluded on February 5, 2018. A first round of MDAT refresher training occurred on February 20, 2018 ahead of survey piloting and a second round from April 23 to April 24, 2018 prior to field deployment.

Training on anthropometrics measurements was designed and led by Dr. Sutton in collaboration with the Laterite Senior Field Supervisor. The training included practical exercises on taking measurements as well as recording the information in the surveys.

SURVEY INSTRUMENT PILOTING

Surveys at the Household

Objectives

The survey pilot was used as an opportunity to test the research instruments' readiness for field deployment, collect data on the amount of time required per household to complete the surveys, and provide enumerators with an opportunity to practice administering the surveys and get feedback from supervisors.

Implementation

Survey piloting was conducted with 42 households in the Nyamirambo sector of Nyarugenge district in Kigali. Boston College, through implementing partner FXB Rwanda, selected pilot households with similar characteristics to households that would be eligible for the intervention. The team for the piloting included 22 enumerators, four field coordinators, and one field supervisor.

Results and Takeaways

Enumerators completed 41 Report on Child surveys, 34 Caregiver Report on Self surveys, and 42 Report on Households surveys. During piloting, Laterite observed that the surveys at the household took longer to administer than anticipated and advised Boston College to delete extraneous questions, specifically those with open-ended responses. Laterite also revised translations and made recommendations for changes in the logic and order of questions.

MDAT Survey

Objectives

The MDAT survey pilot was used as an opportunity to test survey readiness for field deployment, provide enumerators with an opportunity to practice under field-like conditions, and calculate intra- and inter-rater reliability (IRR) thereby assessing enumerator consistency in implementing this complex developmental assessment.

Implementation

The MDAT survey pilot involved 49 children, in order to calculate intra-rater reliability (or, "test-retest") in a subset of 30 children and inter-rater reliability in a subset of 19 children. To evaluate intra-rater reliability, 30 children were assessed then reassessed by the same enumerator one day following their initial MDAT. One child was unable to complete the retest due to illness, reducing the final sample size to 29. To assess inter-rater reliability, 19 children were assessed then reassessed by a different enumerator one day following their initial MDAT. The sample sizes for both tests were provided by Boston College. The MDAT pilot was held at Saint Paul Center in Kigali with the same 42 families interviewed during the pilot of surveys conducted at the household.

Measures of Rater Reliability (IRR)

The MDAT pilot data was analyzed using STATA version 14.2. The distribution of kappa statistics and percentage agreement are presented in Figure 5.

Figure 5. MDAT Pilot Intra- and Inter-rater Reliability

Reliability	Kappa				Percentage Agreement			
	>0.80 excellent	0.61-0.80 substantial	0.41-0.60 moderate	0.21-0.40 fair	>90%	81-90%	71-80%	61-70%
Intra-rater (N=29)	10 (34%)	15 (52%)	4 (14%)	0 -	13 (45%)	13 (45%)	3 (10%)	0 -
Inter-rater (N=19)	3 (16%)	7 (37%)	7 (37%)	2 (11%)	4 (21%)	7 (37%)	6 (32%)	2 (11%)

Overall, both intra-rater reliability and inter-rater reliability were substantial with κ=0.73 and κ=0.62, respectively. Reliability was excellent for 34% of intra-observer reliability and 16% of inter-rater reliability assessments. The majority of assessments had moderate to substantial reliability (κ=0.41-0.80). Only two assessments had fair reliability (κ=0.21-0.40), both within the inter-rater reliability category. In general, intra-rater reliability outperformed inter-rater reliability.

To put these numbers in perspective, Gladstone et al.[1] found intra-observer reliability and inter-observer reliability in 71% and 89% of assessments, respectively. Our reliability measurements indicated less robust reliability than what may be considered the gold standard for MDAT assessments; however, it must be noted that in the Gladstone et al. study, the MDAT assessment was performed by research midwives with significantly more training and experience in early childhood development than professional enumerators.

Adaptation of Field Plan

Based on the IRR results from the MDAT pilot, Laterite carefully reviewed individual enumerator performance and identified four highly performing enumerators, two of whom were promoted to field coordinators on the MDAT field team. Six under-performing enumerators were placed on an alternate list and would conduct MDAT assessments only in the event of core enumerator dropout.

MDAT enumerators were initially trained to perform assessments in pairs; however, during the MDAT pilot, the average duration of assessments was similar whether delivered by individual or paired enumerators. Laterite, therefore, proposed that MDAT enumerators perform assessments individually during data collection and Boston College agreed.

[1] Melissa Gladstone, Gillian A. Lancaster, Eric Umar, Maggie Nyirenda, Edith Kayira, Nynke R. van den Broek, and Rosalind L. Smyth. "The Malawi Developmental Assessment Tool (MDAT): the creation, validation, and reliability of a tool to assess child development in rural African settings." *PLoS medicine* 7, no. 5 (2010): e1000273.

DATA COLLECTION

Schedule

Baseline data collection was carried out over six weeks from April 23, 2018 to June 1, 2018. Two weeks were spent in each district, and districts were surveyed sequentially starting in Nyanza[2] then Ngoma[3] then Rubavu[4]. All data collection was completed in one district before data collection in the following district began.

The MDAT and anthropometric team followed behind the team completing the surveys at the household by a few days so the MDAT survey was completed after the surveys at the household.

Completion Statistics

For data collection from a household to be considered complete, the household must have completed at minimum the Caregiver Report on Self with the primary caregiver, Report on the Household, and Report on Child, MDAT, and Anthropometrics with all eligible children. In total, data collection was completed with 1,049 households. A total of 28 households were replaced and 13 households were dropped from the study due to a lack of replacement household available. The households dropped from the study caused 1 ePW cluster, 330603_0, to fail. In addition, 1 combined cluster, 330905_2, and 1 cPW-only cluster, 561204_1, have only 4 cPW households due to a lack of replacement households in those clusters. After consultation with the Boston College team, these clusters were kept in the baseline dataset and not replaced because the CHW selection and training had already started in these districts. A breakdown of the number of clusters and households in the baseline sample by treatment status and public works type is presented in Figure 6 and Figure 7.

Figure 6. Number of Clusters by Treatment Status in Baseline Sample

	Control	Treatment	Total
Classic PW	75 clusters	75 clusters	150 clusters
Expanded PW	38 clusters	47 clusters	85 clusters
Pooled	97 clusters	100 clusters	197 clusters

Figure 7. Number of Households by Treatment Status in Baseline Sample

	Control	Treatment	Total
Classic PW	374 households	374 households	748 households
Expanded PW	134 households	167 households	301 households
Pooled	508 households	541 households	1049 households

[2] In Nyanza, data collection began on April 23, 2018 and concluded on May 5, 2018.
[3] In Ngoma, data collection began on May 7, 2018 and concluded on May 19, 2018.
[4] In Rubavu, data collection began on May 21, 2018 and concluded on June 1, 2018.

In 36 households, two children met the eligibility criteria for the household's inclusion in the study. In one of the 36 households one child was sick and was not able to be evaluated, and so there are 35 households in the final dataset where two eligible children were evaluated. The final child dataset includes 1,084 children. One household is missing a Report on self with Primary Caregiver; that survey data was on a tablet that malfunctioned and because of the encryption on the surveys the data was not able to be retrieved. The final caregiver dataset includes 1,498 caregivers.

Figure 8. Surveys completed for six survey instruments by District

District	Number of households	Report on Household	Report on Self with Primary Caregivers	Report on Self with Intimate Partners	Report on Child	MDAT	Anthropometrics
Ngoma	347	347	347	119	358	358	358
Nyanza	351	351	351	145	361	361	361
Rubavu	351	351	350	186	365	365	365
Total	1049	1049	1048	450	1084	1084	1084

Figure 9. Count of Surveys Completed for Intimate Partners of Primary Caregivers by Public Works Category.

Public Works Type	Number of Households	Number Primary Caregivers with Intimate Partners	Percent of Households with Intimate Partners	Intimate Partner Interviews Completed	Percent of Intimate Partners Interviewed
cPW	748	421	56.3%	371	88.1%
ePW	301	87	28.9%	79	90.8%
Total	1049	508	48.4%	450	88.6%

Administration of Surveys

Surveys at the Household

The Report on the Child, the Caregiver Report on the Household, and the Caregiver Report on Self were all performed in the home. The order in which the surveys were administered depended on whether the child was able to be assessed. If the child was present and awake, the Report on the Child was administrated first, then the other surveys followed. If the child was asleep or not available, the enumerator would start with the caregiver surveys instead. Due to the sensitive nature of the intimate partner violence questions in the Caregiver Report on Self, this survey was conducted only by enumerators of the same gender as the respondent and in as private a location as possible. In the case that a survey was not completed during the first visit—because there was a mismatch in the genders of the enumerator and respondent, for example—an appointment for mop up would be

communicated to the household immediately and an enumerator would return at the earliest opportunity.

The median completion time for all of the surveys at the household was 2 hours and 6 minutes per household in households where only primary caregivers were interviewed and 2 hours 53 minutes in households where both the primary caregiver and his or her partner were interviewed. In 35 households with two eligible children, a second Report on Child survey was completed and added a median of 53 minutes to the total stated median completion times. These figures compare to the projected completion time of 3 hours for all surveys at the household.

Figure 10 Median duration for each survey

Survey	Median Time (minutes)
Household Surveys	
Caregiver Report on Self	44
Primary caregivers only	43
Secondary caregivers only	47
Caregiver Report on Household	30
Report on Child	53
MDAT & Anthropometrics Surveys	
MDAT	47
Anthropometrics	n/a*
* Anthropometrics measurements were first recorded on paper and then entered into the tablet later, so an accurate median time can't be calculated from the SurveyCTO output.	

MDAT and Anthropometrics Surveys

Participants were scheduled to attend appointments for MDAT assessments and anthropometric measurements at centralized locations. In each cell, a community health worker selected a safe place—such as the cell office, a church, or school—to serve as the data collection site. Participants were notified in advance regarding the location and timing of these surveys. The median completion time for MDAT assessments was 47 minutes for each child compared to the projected time of 50 minutes per survey.

On the day of the surveys, enumerators explained to caregivers that they would first play with the child then take measurements and reminded caregivers to do both sessions before leaving the venue. A dedicated enumerator took measurements for weight, height or length based on the age of the child, and MUAC and recorded observations on a paper form with a unique ID to identify the child. These measurements were entered into SurveyCTO at the earliest opportunity and always on the same day as data collection.

Participant Compensation

All study households received 5,000 RWF, disbursed in increments of 2,500 RWF each at the completion of the household surveys and the MDAT, as compensation for their time and to defray the cost to travel to a centralized cell location for the MDAT and anthropometric assessment.

Challenges

The team encountered and addressed the following challenges during data collection:

1. Changes of caregivers or their partners within households: There were several cases in which the caregivers or their intimate partners sampled during field preparation changed by the time of data collection. Reasons for these changes include but are not limited to existing caregivers or partners leaving the household, new caregivers or partners joining the household, or inaccurate reporting or recording during field preparation. To address these changes, enumerators recorded the new caregiver or partner's information during data collection and the household and caregiver datasets were updated during data cleaning to reflect any changes.

2. Inaccurate VUP list: Information such as names and national IDs of VUP participants were incorrectly recorded by local authorities. To address this issue, Laterite included questions in each survey that asked respondents to verify their information and provided an opportunity to update incorrect information.

3. During the initial days of data collection, enumerators observed that, for some children in study households, the birth dates recorded during field prep were incorrect. The field team requested to add a question to the Report on Child to confirm the child's birth date at data collection and, if necessary, amend the date and identify which document was used to verify it. If the household did not have documentation available, the field team confirmed the date of birth by speaking with the local community health worker who has access to the child's date of birth on health records. This change to the survey was implemented as of April 25, 2018. As a result of verifying child birth dates during data collection, twenty households were deemed ineligible, of which 12 were replaced and 8 were dropped because a replacement was not available. Details regarding these households are included in Tables 7 and 8. We are continuing to investigate how and why dates of birth were recorded incorrectly at field prep and will submit clarification as an addendum to this report.

4. An error in the age calculation in the first deployed version of the Report on the Child survey resulted in some children's ages being calculated incorrectly, and 37 children doing an ASQ module that did not correspond to their actual age. The error was noticed and fixed after the within the first three days of data collection. Immediately after identifying the issue, a team was deployed for an ASQ mop up and administered the correct module to the children affected. During data cleaning, the data from the incorrect ASQ module was replaced with the data from the correct ASQ module. For all children for whom the calculation error did not result in their doing the wrong ASQ module, only their ages were updated during data cleaning. A new version of the survey with a revised age calculation was deployed for all further data collection.

5. In a few instances, the household surveys were not able to be completed before the MDAT. The SurveyCTO version of the MDAT survey was programmed such that an MDAT survey could not be submitted before the Report on Child was complete. Because of this, in these few cases the MDAT was done on paper and entered into the table after the Report on Child was

complete during mopup. This was only done when the alternative would have been that the MDAT was not completed; for example, when a mopup MDAT would not be possible. Enumerators requested approval from the senior field supervisor before proceeding with a paper MDAT survey. All MDAT surveys that were first completed on paper are flagged in the dataset with the variable "mdat_paper". There are 34 children in the final dataset whose MDAT was done on paper and then entered into the tablet. For the midline data collection, we plan to change the coding of the MDAT to allow enumerators to override the break in the survey if the Report on Child hasn't been done and proceed with the survey so there will be no MDAT surveys done on paper.

6. The graphics for the ASQ were never shown in the tablet due to an issue in the survey coding. But, the enumerators had paper versions of the graphics that they used in administration of the ASQ.

DATA QUALITY MONITORING

Field Supervision

Throughout data collection, the field supervisor for the surveys at the household would choose one sub-team to accompany each day to confirm that interviews were conducted in the right households, protocols were followed, and ethical considerations were met. When enumerators raised issues during the day, the field coordinator reported them immediately to the field supervisor who communicated them to the data manager for the final decision. The field supervisor would observe one or two surveys (with the exception of the Caregiver Report on Self since it included questions about particularly sensitive information) for each sub-team's member to confirm that questions were asked and answers recorded correctly. The field supervisor and senior field supervisor for the MDAT and anthropometric team roved among enumerators to check that assessments were conducted according to protocol and to offer guidance or corrections.

At the end of each day, the field supervisors updated the log of surveys completed and issues to be cleaned in the data and compiled a daily field report for the data manager. The teams for both the surveys at the household and the MDAT and anthropometric assessments attended a daily debrief session led by the senior field supervisor and data manager. During the debrief, the team discussed issues from the day's surveys, and the data manager provided solutions and communicated any changes in the survey. Before heading to the field each morning, the team met with the data manager who updated the list of households with any replacements from the previous day, reviewed the schedule, and addressed quality concerns from the data collected in the previous days.

Real-time Completion Tracking

Laterite used SurveyCTO's feature of real-time publishing of form submission data into Google Sheets to track the progress of data collection compared to the targets in the field plan. Dashboards were created to track the completion of the required surveys for each household (household completion status) and then the completion of surveys for all households in a cluster (cluster completion status.) The cluster completion status was shared with the Boston College team in real time, which allowed

them to start the intervention in the households of completed clusters as soon as possible. The Google Sheets were also used to track replacements of caregivers and households and flag duplicate surveys.

Routine Monitoring

Laterite used proprietary audit algorithms to review survey metadata to flag unusual submissions such as those with changes of location, early or late starting times, comparatively short or long durations, and simultaneous submissions. Concerning surveys were flagged to the Data Manager and Senior Field Supervisors for further investigation.

In addition to the real-time monitoring using Google Sheets, Laterite routinely monitored the cleaned data for survey duplication, household and caregiver replacement, household dropout, child dropout and mortality, and household survey completion.

Laterite reported this information to Boston College in the Weekly Data Collection Reports.

Flagged Survey Responses

Several survey responses triggered the risk of harm protocol. These flags were monitored in real-time by field supervisors and twice weekly by the data monitoring team to ensure that the risk of harm protocol was followed appropriately.

Figure 11. Flagged Responses Triggering the Risk of Harm Protocol

Variable	Question Text	Response triggering Risk of Harm Protocol	Instances Reported # (% of those asked)
	Caregiver Report on the Self		
	The following are problems or signs of problems that people might have. I am going to read each one carefully and please tell us how many times it happened to you or stressed you last week including today.		
hscl_20	Thoughts of ending your life	A little / Quite a Bit / Extremely	136 (9.1%)
	Has any argument between you and your partner or most recent partner ever led you to do any of the following?		
cts_9	Used a knife or any other weapon to harm your partner	Yes	4 (0.3%)
cts_10	You hit your partner with something that could cause injuries to your partner	Yes	11 (0.9%)
cts_13	You used forceful means to be able to have sexual intercourses with your partner	Yes	41 (3.3%)
	Has your partner ever done any of the following things to you?		

cts_20	She/he used a knife or any other weapon	Yes	40 (3.2%)
cts_21	She/he hit you with an object that could cause injuries	Yes	75 (6.0%)
cts_24	She/he forced you have sexual intercourse when you didn't want	Yes	150 (12.0%)
	Report on the Child		
	Adults use certain ways to teach children the right behavior or to address a behavior problem. I will read various methods that are used and I want you to tell me if you or anyone else in your household has used this method in the past 30 days with ${child_name}:		
cd_12	Beat him/her up, that is hit him/her over and over as hard as one could	Yes	13 (1.2%)

Laterite was asked by Boston College to flag several additional survey responses (see Figure 12). Responses were flagged and reported only if occurring more than 10 times in 3 months or, in the case of parq_4, if the response was, "almost always true."

All additional flagged responses were reported to Boston College weekly with household identifying information.

Figure 12. Additional Flagged Responses

Variable	Question Text	Flagged Response	Instances Flagged # (% of those asked)
	Caregiver Report on Self		
	Has any argument between you and your partner or most recent partner ever led you to do any of the following?		
cts_6	Shoving your partner	Yes	177 (14.1%)
cts_7	Grabbed your partner	Yes	165 (13.1%)
cts_8	Slapped or punched your partner	Yes	131 (10.4%)
cts_12	Kicked your partner	Yes	17 (1.4%)
	Has your partner ever done any of the following things to you?		
cts_17	She/he shoved you	Yes	219 (17.4%)
cts_18	She/he grabbed you	Yes	191 (15.2%)
cts_19	She/he hit you	Yes	267 (21.2%)
cts_22	She/he pushed you into a wall	Yes	149 (11.9%)
cts_23	She/he kicked you	Yes	103 (8.2%)
	The following questions are about how you behave with your child/children in daily life. Please pick how accurate you think these statements might be:		

parq_4	I hit my child/children even when (s)he may not deserve it	Almost always true	31 (2.1%)

Audio Audits

Audio from a random sample of 10% of all surveys conducted at the household was automatically recorded using the in-built feature of SurveyCTO. The questions that triggered the audit were pre-selected and recordings were reviewed to assess whether (i) the interviews actually took place; (ii) enumerators were following proper interview procedures such as: properly reading consent forms and sticking to the script while asking sensitive questions; (iii) enumerators were asking questions with a respectful tone and without pushing the respondent or leading them towards a certain response; and (iv) in cases where applicable, following protocol for risk of harm. The questions audited are listed in Figure 13.

No audio audits were set for the MDAT and anthropometrics surveys since the proper administration of these assessments relied less on enumerator-participant dialogue. These surveys were instead administered under supervised conditions and enumerator behavior was closely monitored.

Throughout data collection, Kinyarwanda-speaking data auditors reviewed the audio recordings to confirm that there was dialogue between the enumerator and the respondents (i.e. that responses were not entered without actually asking the questions) and that enumerators were following proper interview procedures like reading consent forms in full and asking questions in a respectful tone without pushing the respondent or leading them towards a certain response. Issues identified by the auditors were recorded and relayed to the data manager for proper follow-up and resolution with the field supervisors.

Figure 13. Questions in the Audio Audit

Variable	Question Text	Why Audited
Caregiver Report on Household		
consent	Enumerator: please read the consent form to the participant if you have not already. Did [caregiver name] agree to participate and sign the consent form?	Ensure consent collected appropriately
Caregiver Report on Self		
disab_hiv_1	Let me remind you that all of your answers are confidential, and that the information you provide is very important for the survey. Could you please tell me the result of your last test for HIV?	Ensure reminder of confidentiality was read as written; Check that the enumerator was clear, courteous, at ease, not rushed and not harsh.
cts_19	[Has your partner ever done any of the following things to you?] She/he hit you	Check that the enumerator's was clear, courteous, at ease, and not harsh.
cts_note2	Now I would like to ask about your partner. These questions might remind you of difficult events or circumstances. At any point if you do not wish to answer these questions let us	Ensure the enumerator read the instructions as written, that it was clear the respondent could opt-out

	know and we can skip a particular question or move to the next section. Has your partner ever done any of the following things to you	
Caregiver Report on Self		
chh_momhiv	Let me remind you that all of your answers are confidential, and that the information you provide is very important for the survey. Did you/the mother know if you were HIV+ when you were pregnant with [child_name]?	Ensure reminder of confidentiality was read as written and acknowledged by the respondent; Check that the enumerator was clear, courteous, at ease, not rushed and not harsh.
cd_12	[I want you to tell me if you or anyone else in your household has used this method in the past 30 days with [child name]:] Beat him/her up, that is hit him/her over and over as hard as one could.	Check that the enumerator read the question as written, and that they were clear, at ease, and not harsh or forceful.
home_13	Gross motor objects available (e.g., ball, rope, ring, stone).	Check that the enumerator was clear, at east, not rushed, and that the enumerator looked for the objects mentioned or the participant brought them to the enumerator.

DATA CLEANING

Laterite cleaned data iteratively throughout data collection to identify issues as they arose. At the end of baseline data collection, a master data cleaning file was compiled that included all deduplication and cleaning done throughout data collection, as well as the merging of datasets, de-identification of the dataset, coding of missing values, and other steps to prepare the data for Boston College. All data cleaning was completed in STATA version 14.2 or higher.

Duplicates Management

Duplicates identified during data quality monitoring by unique identifiers were managed as follows:

- True duplicates (all variables identical): one copy was deleted using the *duplicates drop* command.
- Partial duplicates (not all variables identical): both copies were flagged using the *duplicates tag* command, removed from the dataset, logged, and investigated by the data manager. Following investigation, the Master Corrections .xls file and/or the STATA .do file (depending on the issue identified) were updated and the duplicates were cleaned with the subsequent round of data.

Duplicates reports were generated daily during the first week of data collection then with decreasing frequency as field errors decreased and data quality improved.

Additional Caregivers

In 17 households, Laterite noted the addition of new intimate partners to households following field preparation and prior to baseline data collection. In some cases, these partners joined households because the primary caregiver in the household was replaced. In all cases, these partners were assigned new identification numbers. These additions were coded in the STATA .do file in order to update the Caregiver Report on the Self and in the Master Corrections .xls file in order to update the Caregiver Report on the Household.

Replacements

Household

A household's status as main or replacement is identified by the variable replacement_hh. There are 28 replacement households and 41 caregivers from replacement households in the final baseline dataset. In addition to the replaced households, 13 households had to be dropped from the sample because there was no replacement available.

Figure 14. Households Replaced during Data Collection

Original Household ID	Replacement Household ID	Reason for Replacing the Household
111214	112669	Caregiver & child unavailable for the entire duration of data collection
106843	105872	Caregiver & child unavailable for the entire duration of data collection
109428	106141	Caregiver moved
109359	108123	Caregiver moved
100095	100153	Caregiver unavailable for the entire duration of data collection
102831	102652	Child overage
103352	103383	Child overage
104486	104455	Child overage
104852	105049	Child overage
104883	105074	Child overage
109630	108424	Child overage
106363	108247	Child overage
107263	109227	Child overage
108965	108497	Child overage
107154	107031	Child overage
111762	114765	Child overage
112186	111142	Child overage
101434	101241	Eligible child was sick
109093	109706	Eligible child was sick
101531	101638	Eligible child moved away
107969	105978	Eligible child moved away
109546	108676	Household moved

106110	105333	Household was duplicated
109337	107165	Household was duplicated
104974	104949	No child in the household
115676	112248	No child in the household
112220	115600	No child in the household
105297	107507	No one present in household

Figure 15. Households Dropped during Data Collection

Original Household ID	Reason for Dropping the Household
109722	Child not eligible
107586	Child not eligible
107201	Child not eligible
107249	Child moved
111378	Cannot find Household
115692	Child not eligible
115247	Child not eligible
113734	Child moved
115109	Child not eligible
113545	Child not eligible
114402	Child moved
114836	Child moved
110927	Child not eligible

Primary Caregiver

In cases of replacement of primary caregivers, new primary caregivers assumed the same primary caregiver identification number as the previous primary caregiver

Master Datasets

The data cleaning process involved reshaping the raw dataset from SurveyCTO, containing all form submissions, and transforming it into cleaned—de-duplicated, de-identified—datasets. Reshaping and merging the results of the five surveys, Laterite created three datasets: Caregiver, Household, and Child. The folder "6-Baseline Data Cleaning" contains all the necessary files (raw data .csv files, .dta files, auxiliary files & .do files) used to produce the final datasets. Details about the inputs and structure of the files is outlined Readme.docx file included with the data sets.

The first step of the data cleaning process converted the raw data into the labelled Stata format dataset by running the import_.do files that are output from SurveyCTO using the raw .csv files. This step was repeated for all five surveys: Anthropometrics, Caregiver Report on the Household, Caregiver Report on Self, MDAT, and Report on Child. One of the inputs to this .do file is the survey-specific corrections file, which is used to make changes to values in the dataset by referring to the submission key and variable name. The corrections files are updated manually by the data monitoring

and cleaning team at Laterite to incorporate changes suggested by the data collection team in the field or address values recorded erroneously. In total, there were 84 corrections to the Caregiver Report on Self, namely to update or add caregiver information; 39 corrections to the Caregiver Report on Household, again to update caregiver information; 19 corrections to the MDAT to link children with their corresponding household and correct names; 4 corrections to the Report on Child to correct a household ID, and names; and 9 corrections to the Anthropometrics to correct measurements that were erroneously recorded and update a household and child ID. All additional changes are made to the dataset via the data cleaning do files.

For the Caregiver and Household surveys, data cleaning is done in one .do file each. The data cleaning process involved pulling relevant information from the field prep data, comparing caregiver information across field prep and baseline data collection, merging the translations of enumerator comments, resolving duplicates, labelling variables, and re-coding skipped or missing values according to the Boston College team's guidance. The final outputs are the Caregiver dataset with 1,498 observations from data collected through the Caregiver Report on Self and the Household dataset with 1,049 observations from data collected through the Caregiver Report on Household.

For the Child surveys, survey-specific cleaning, like removing duplicates and merging in mop up data, are done in data cleaning .do files for each survey. Within these cleaning files, duplicates are resolved, wrong surveys dropped, replacements resolved, and skips and missing values re-coded. Along with the standard data cleaning steps, the Report on Child data cleaning file replaces the ASQ modules conducted erroneously with the data collected during the mop up. For MDAT, as requested by the Boston College team, modules of the survey split into two for administrative ease are merged together and redundant variables are dropped. The three datasets output from the survey-specific cleaning .do files are merged together using the Master Child Data Cleaning .do file. Within this file, the variable child_id is the unique key used to merge all the child datasets so that the cleaned results from the Report on Child, MDAT, and Anthropometrics surveys are available in one master child dataset. The final Child dataset included 1,084 observations.

Observations from the three datasets can be linked using the household ID variable (hhid), a unique identifier for each household.

Appendix 1. Risk of Harm Action Flowchart

RISK OF HARM ACTION FLOWCHART

	Suicidality Did the participant endorse any of the following:	**Harming Others** Did the participant endorse any of the following:	**Being Harmed by Others** Did the participant endorse any of the following:
Flag	HSCL20	Expression of intent to harm CD11	Expression of concern about being harmed by others Expression of currently being harmed by others
	If YES	*If YES*	*If YES*
Urgency	***IMMEDIATE*** *PARTICIPANT SHOULD NOT BE LEFT ALONE.*	***IMMEDIATE*** *PARTICIPANT SHOULD NOT BE LEFT WITH POTENTIAL VICTIMS.*	***IMMEDIATE*** *PARTICIPANT SHOULD NOT BE LEFT WITH POSSIBLE ABUSERS.*
	Ask:	*Find out:*	*Find out:*
Assess Severity	• When did thoughts of killing yourself start? • How often do you have these thoughts? • Now and in the past, what triggered the thoughts? • Have you ever done anything to harm yourself in the past? • Do you currently have a plan for harming yourself?	• Who are the people involved and how are they related to the participant? • How often does the participant see them? • Is there an immediate risk of someone being harmed (such as murdered or raped)? • Have the authorities ever been notified?	• Who are the people involved and how are they related to the participant? • How often does the participant see them? • Is there an immediate risk of physical or sexual abuse? • Have the authorities ever been notified about this situation?
	Is the participant actively suicidal?	*Is there immediate risk of harm to others?*	*Is there immediate risk of physical or sexual abuse?*
	If YES	*If YES*	*If YES*
Contact Supports	• Ask participant to identify an adult, guardian, or important person whom they are close to • Contact the identified person and express your concern to them	*The police or other legal authority must be notified right away. As appropriate you may want to consult with the relevant village leadership and IMB staff.*	*If abuse relates to a child under 18 years of age:* • Inform the umudugudu head/leader • Tell him/her to inform the police *If abuse relates to a participant aged over 18 years:* • Research coordinator and Project Manager will inform the correct authorities
Contract for Safety	*Do not leave until you have ensured that a responsible adult can keep the participant safe* • You may want to create a signed contract for safety	• You may want to create a signed contract for safety	
Make the Referral	Fill out referral form	Fill out referral form	Fill out referral form
	Alert Health Center to case	Alert Health Center to case	Alert proper official to case
	Give form to caregiver/trusted adult; inform them of next steps	Give form to caregiver/trusted adult; inform them of next steps	Give form to caregiver/trusted adult; inform them of next steps
Backup	• Contact research coordinator and Project Manager immediately	• Contact research coordinator and Project Manager immediately	• Contact research coordinator and Project Manager immediately

Appendix 2. Survey Changes during Baseline Data Collection

Survey	Description of Change	Date	Version*
CGRS	Pull in pcg_id & scg_id from household list; calculate cg_id	April 24, 2018	1804241708
CGRS	Made all of the "check" questions at the beginning of the survey required	April 24, 2018	1804241708
CGRS	Fix translation of caregiver_type question	April 24, 2018	1804241708
CGRH	Pull in pcg_id & scg_id from household list; calculate cg_id	April 24, 2018	1804241706
CGRH	Made all of the "check" questions at the beginning of the survey required	April 24, 2018	1804241706
CGRH	Fixed translation of caregiver_type question	April 24, 2018	1804241706
Anthro	Added child_sex variable	April 24, 2018	1804241523
Anthro	Added questions to confirm child date of birth, option to reenter a new date of birth if incorrect, and documentation used to verify date of birth	April 24, 2018	1804241841
ROC	Added questions to confirm child date of birth, option to reenter a new date of birth if incorrect, and documentation used to verify date of birth	April 24, 2018	1804241848
MDAT	Added questions to confirm child date of birth, option to reenter a new date of birth if incorrect, and documentation used to verify date of birth	April 24, 2018	1804241858
MDAT	Updated age calculation to fix error in age_months where it was sometimes off by 1 or 2 months.	April 25, 2018	1804251830
ROC	Updated age calculation to fix error in age_months where it was sometimes off by 1 or 2 months. Also changed age_months to half month intervals in this survey.	April 25, 2018	1804251959
Anthro	Updated age calculation to fix error in age_months where it was sometimes off by 1 or 2 months.	April 25, 2018	1804241841
* any survey with a version number greater than or equal to this will have the change			