Sannut Pre-Analysis Plan

*Version 1*

*1 December 2016*

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# I. Introduction

This pre-analysis plan was drafted before the endline data collection for the UNICEF Sanitation and Nutrition (Sannut) evaluation in Kenya. No baseline was conducted for this evaluation.

**Project Name:** Evaluating the effectiveness of an integrated sanitation and nutrition program

**Name of Client(s):** Bill and Melinda Gates Foundation, UNICEF

**Project Team:**

* Patricia Pina, *Director*
* Lilian Lehmann, *Senior Manager*
* Jeff McManus, *Technical Team Point Person*
* Gerishom Gimaiyo, *Associate*
* Matt Yarri, *Associate (Alumnus)*
* Michael Otieno, *Field Manager*

**Objective:**

This Pre-Analysis Plan (PAP) outlines the analysis that will be done and indicators that will be used as part of IDinsight’s evaluation of UNICEF’s and Kitui County Government’s sanitation and nutrition programs. It also includes all other technical considerations that form part of the data analysis.

**Audience:**

This PAP will be registered with the Registry for International Development Impact Evaluation ([website](http://www.3ieimpact.org/en/evaluation/ridie/)). Registration will be completed before endline data collection begins.

# II. Sannut Intervention

## II.1. Description of Activities

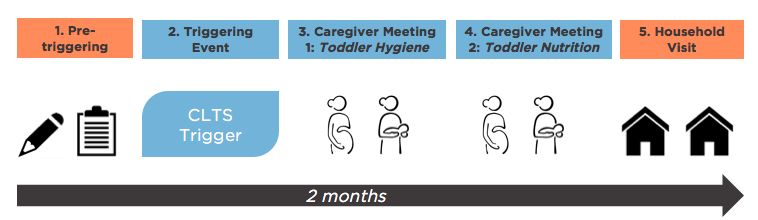
UNICEF is the overall program manager, offering technical support to the Ministry of Health and Sanitation Services in Kitui County as well as providing matching funds to finance the implementation. Kitui County Government is the primary implementer of the intervention. IDinsight is the evaluator of the program, contracted by BMGF to evaluate UNICEF’s program in Kenya.

The Sannut intervention is a modified form of the Kenya National Protocol for Community Led Total Sanitation (CLTS). The intervention clarifies with the community the link between open defecation and child malnutrition, through the addition of two interactive meetings that sensitize caregivers on proper toddler hygiene and nutrition, and household visits that reinforce these messages. As such, the evaluation is testing the hypothesis of whether additional focus on toddler hygiene and nutrition with community level messaging leads to change in caregiver behaviors/practices that will ultimately reduce the risk of a child becoming malnourished during their first 1000 days.

These supplemental activities are summarized below and in Figure 1:

1. Addition of two caregiver gatherings following the CLTS process to sensitize mothers and other caregivers of children under 2 on the importance of toddler hygiene and nutrition for the health of their children.
2. Household follow-up visit that includes, in addition to standard CLTS messaging, the supplemental messages covered in the two caregiver meetings.

Figure 1: Intervention Activity Overview



Prior evidence has shown a link between child malnutrition and stunting and the behaviors targeted in this intervention.

## II.2. Theory of Change

There is limited published evidence of how sanitation and nutrition can be integrated programmatically.[[1]](#footnote-1) Our study seeks to understand if it is possible to effectively integrate these two sets of messages – sanitation and toddler nutrition - into one program in order to highlight the link between poor sanitation and undernutrition.

There is strong evidence that fecal contamination of the household environment, soil contaminated with human and animal feces, and unsafe disposal of toddler and child feces contribute significantly to the diarrheal disease burden.[[2]](#footnote-2),[[3]](#footnote-3),[[4]](#footnote-4),[[5]](#footnote-5) Indeed, water and sanitation interventions are associated with a lower risk of diarrhea and better nutrition outcomes.

Additionally, evidence shows that community-led breastfeeding promoting strategies can significantly increase exclusive breastfeeding rates with developing country communities[[6]](#footnote-6),[[7]](#footnote-7),[[8]](#footnote-8),[[9]](#footnote-9). Coupled with a suite of cost-effective interventions (e.g. Vitamin A supplementation provided to toddlers at most rural health facilities) that prevent micronutrient deficiencies, a further contributor to child malnutrition and cognitive impairment[[10]](#footnote-10), there is evidence of how nutrition programs impact undernutrition.

However, these interventions are implemented as standalone sanitation or nutrition interventions and while there is significant interest in convergence of these two sectors due to their similar impact on undernutrition, there is no evidence of programming that has jointly impacted both sanitation and nutrition outcomes.

The study is measuring the impact of this combined approach on influencing key sanitation and nutrition behaviors that affect early childhood malnutrition and development, and specifically test whether the Sannut intervention leads to improved sanitation and nutrition outcomes compared to traditional CLTS activities.

Figure 2: Pathways to Child Malnutrition and Stunting

Child Malnutrition & Stunting

Caloric Deficiency

Environmental Enteropathy

Chronic Helminth Infection

Acute Diarrhea

Ingestion of fecal matter, harmful bacteria, helminths, and other pathogens

III. Exposure to adult feces

V. Exposure to child & toddler feces

Exposure to animal feces

IV. Improper hand-washing practice

VI. Exposure to animal feces

Ingestion of unsafe water

VII. Ingestion of contaminated food

Exposure to child & toddler f

Ingestion of pathogenic vectors from other sources

Vitamin/Micronutrient Deficiency

Weakened immune system

I. Insufficient breastfeeding practices

Insufficient dietary diversity

II. Absence of vitamin supplementation

Other causal nutritional factors

Nutrition Pathway

Sanitation Pathway

Insufficient intake of nutrition items critical to growth and development

Figure : Pathways to Child Malnutrition and Stunting

*Outcomes targeted by intervention*

*Not targeted by intervention*

Figure 3. Traditional CLTS and Sannut Activities

III. Reduced exposure to adult feces

VI. Reduced exposure to animal feces

V. Reduced exposure to child/toddler feces

VII. Reduced ingestion of contaminated food

IV. Improved hand-washing practice

I. Improved breastfeeding practices

II. Improved vitamin supplementation

Community Trigger Event

Household Follow-up Visits

Caregiver Meeting 1: Toddler Sanitation

Caregiver Meeting 2: Toddler Nutrition

Infant

Construction of household latrines

Construction of household hand washing facilities

Sustained behavior change and use of sanitation facilities

Collective community action

Feelings of shame and disgust

Establishment of community norms

Detailed sanitation knowledge

Construction advice

Detailed nutrition knowledge

Focused content on:

- Clean toddler environment

- Disposal of toddler feces

- Toddler hand washing

Focused content on:

- Proper Breastfeeding

- Food safety

- Health Facility Visits

Improved sanitation knowledge

Improved nutrition knowledge

Improved sanitation practice

Improved nutrition practice

*Outcomes targeted by intervention*

*Traditional CLTS Activities*

*Sannut Activities*

# III. Evaluation

## III.1. Identification strategy

To determine the causal impact of the Sannut activities on sanitation and nutrition outcomes, the evaluation entails:

* A cluster Randomized Control Trial (RCT) at the level of the village (“kijiji”), where key outcome indicators in the intervention group (receiving supplemental toddler sanitation and nutrition messaging, as an add-on to the standard CLTS) will be compared to a control group (receiving only standard CLTS). Knowledge and practices of both sanitation and nutrition behaviors will be measured. The RCT will yield rigorous, causal estimates of the impact of supplemental nutrition messaging on outcomes of interest.
* A process evaluation to assess the implementation quality of the program. This will provide insights on implementation fidelity and shed light on the causal pathways described in the theory of change.

## III.2. Unit of Treatment

The unit of treatment for Sannut is the kijiji (a unit of administration consisting of 30 – 50 households on average, also known as a village). Sannut kijijis will receive two caregiver meetings overlaid on traditional CLTS, which are conducted by trained Public Health Officers. Kijijis included in the sample frame were randomly assigned to either the treatment or control group. A complete list of kijijis was obtained and Stata/IC 14.0 was used to do the random assignment for the kijijis in the sample frame. The kijijis were stratified at level of the ward,[[11]](#footnote-11) leading to an equal number of treatment and control kijijis in each ward. Treatment groups will receive the Sannut meetings in addition to CLTS activities and control groups will only receive traditional CLTS activities.

## III.3. Data Collection

### III.3.i. Unit of Analysis

The unit of measurement/analysis is the household. Data collection on sanitation and nutrition knowledge and practices will be collected from caregivers of young children.

III.3.ii. Types of Data

* Survey data will be collected at household level from a sample of all eligible caregivers (caregivers with children under 5 years) in both the treatment and control group (see [discussion](#Sample_Frame) of this sampling of kijijis).
* Process data will be collected to provide further information on implementation quality of the Sannut meetings.

III.3.iii. Rounds of Data Collection

There will be one round of data collection, i.e. during the endline survey. Process data is being collected as the implementation of the program is progressing.

## III.4. Evaluation Timeline

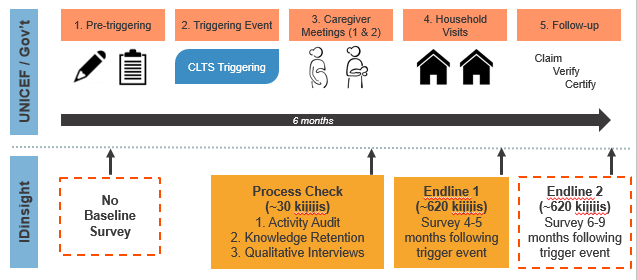
Figure 4 displays an overview of evaluation activities overlaid onto the key elements of the Sannut Intervention. As the two caregiver meetings are implemented, a process evaluation is being conducted among a subset (~5% of evaluation kijijis) of households in both the treatment and control groups to measure implementation quality, contextualize quantitative findings, and identify additional recommendations to inform UNICEF program decisions.

Endline activities will begin approximately 5-6 months following the onset of triggering activities, started in August/ September 2016. Endline surveying is tentatively scheduled for March and April of 2017.

A second round may be commissioned to assess longer-term behavior adoptions among the evaluation households. Reasons for a second endline might include being able to achieve greater statistical power, or to evaluate if results seen in the first endline are sustained ~3 months later.

Baseline will not be conducted for this evaluation due to the rapid rollout of PATUMA[[12]](#footnote-12) program by Kitui County Government. The evaluation has been designed to detect an impact on outcomes even without a baseline survey.

Figure 4: Overview of Evaluation Timeline and Activities



## III.5. Sampling and Randomization

### III.5.i. Kijiji Sampling and Randomization

Sannut activities are overlaid on traditional CLTS activities being conducted in Kitui county. The county is conducting CLTS in 2,100 kijijis under the PATUMA program, and to create the Sannut sample frame, the following exclusion criteria was applied to kijijis in the PATUMA program.

* Kijijis that were more than 10 km away from a health facility[[13]](#footnote-13)
* Kijijis in a ward where Population Services Kenya (PSK) is conducting community nutrition outreach[[14]](#footnote-14)
* In a ward that is mostly (>90%) ODF[[15]](#footnote-15)
* In urban or peri-urban sub counties (Kitui Central, Mwingi Central, Mwingi East)[[16]](#footnote-16)

With the sample frame defined, the remaining 724 kijijis not excluded by these criteria were then randomly sampled for inclusion in the evaluation, with stratified assignment to treatment and control occurring at the ward level. Some kijijis were randomly excluded when the required sample size was achieved. Stratification was conducted at this level to 1) ensure geographic balance between treatment and control groups and 2) to ensure that wards, which are the administrative unit responsible for overseeing the PATUMA CLTS rollout, had the same percentage of kijijis being set aside for the Sannut intervention.

### III.5.ii. Household Sampling within Selected Kijijis

The target population for the Sannut intervention is all households in the study region with children under 5 years, with a special focus on households with children under 2 years. In order to detect meaningful effect sizes among all target households and among this priority subgroup, we will randomly sample 5 households with children under 2 per kijiji and 3 households with children between 2 and 5 per kijiji, for a total of 8 households per kijiji.[[17]](#footnote-17) For kijijis with less than 8 eligible households as per the sampling strategy, all eligible households will be surveyed.

Since we are intentionally oversampling households with children under 2 relative to the target population, we will include sampling weights in the analytical model to recover the average treatment effect in the target population.

# IV. Analytical Model

The indicators of interest are sanitation and nutrition outcomes at endline for children within their first 1000 days of life, specifically, sanitation and nutrition knowledge and practices of caregivers of children under 5. The specific research question is:

***Do Sannut activities lead to significant improvements in sanitation and nutrition outcomes (see Table 1) compared with traditional CLTS activities?***

## IV.1. Outcomes

Table 1 provides a brief summary of the key outcome indicators (see Appendix I for the questions that will form each indicator). The unit of analysis in each of these models is the household, and each model will be applied separately to the whole sample and to the primary subgroup of interest (households with children under 2). Weighted Least Squares will be used to estimate treatment effects in each model.[[18]](#footnote-18)

Table 1: Summary of Outcome Indicators

|  |  |
| --- | --- |
| Outcome Indicator | Summary of Index |
| Latrine Use | **Type:** Binary  **Summary:** Binary outcome for whether respondent currently uses latrine |
| Latrine Structure Maintenance | **Type:** Integer scale  **Summary:** Linear composite (total score divided by all questions/items in a latrine observation checklist with each item on the checklist scoring either zero or one) of latrine maintenance score constructed by standardizing treatment outcomes with the control group mean |
| Courtyard Cleanliness | **Type:** Integer scale  **Summary:** Linear composite (total score divided by all questions in a cleanliness checklist with each item on the checklist scoring either zero or one) of courtyard cleanliness score constructed by standardizing treatment outcomes with the control group mean |
| Self-reported Disposal of Child Feces | **Type:** Binary  **Summary:** Binary outcome for whether child feces are disposed of correctly depending on the type of diaper/napkin/underwear used |
| Proper Breastfeeding Practice | **Type**: Binary  **Summary: Binary outcome** for whether caregiver is properly breastfeeding toddler based on toddler age. |
| Health Facility Visits | **Type:** Binary  **Summary:** This outcome has 3 binary sub-outcomes that will be tested separately: one for general visitation, one for vitamin A, and one for deworming.  **X.1** – True if either maternal health card displays or respondent self-reports a health facility visit in the past 2 months  **X.2** – True if youngest child has received Vitamin A supplement in the past 6 months  **X.3** – True if youngest child has received deworming treatment in the past 6 months |
| Hand-washing Infrastructure | **Type:** Binary  **Summary:** Binary outcome for whether household has a *stocked* handwashing facility in the homestead. |
| Hand-washing practice | **Type:** Binary  **Summary:** Binary outcome for whether respondent and children are following proper handwashing practice. Each of these two types of individuals will be tested separately as sub-outcomes. |
| Child Diarrhea | **Type:** Value between 0 and 1  **Summary:** Each household is assigned a percentage (value between 0 and 1) based on the fraction of the children in the household (that the caregiver is aware of) that showed symptoms of diarrhea in the past 2 weeks. Only applicable to children > 6 months who are eating solid foods |
| Sanitation Knowledge | **Type:** Integer scale  **Summary:** Linear composite (total correct questions divided by all the questions asked with each question having a score of one) of sanitation knowledge questions constructed by standardizing treatment outcomes with the control group mean |
| Nutrition Knowledge | **Type:** Integer scale  **Summary:** Linear composite (total correct questions divided by all the questions asked with each question having a score of one) of sanitation knowledge questions constructed by standardizing treatment outcomes with the control group mean |

## IV.2. Covariates

Table 2 lists the covariates that will be included in the secondary specification of the analysis model in order to explain variance in the outcome variable and to obtain a more precise estimate of the treatment effect. These covariates were selected based on discussions with the client and internal research on the most likely predictors of the outcomes of interest, while excluding any covariates that could potentially be influenced by the intervention. We will also report the treatment effect without controlling for any covariates (see Base Specification below).

Table 2: Summary of Analysis Covariates

|  |  |
| --- | --- |
| Covariate Metric | Summary of Covariate |
| Education of Caregiver | Highest level of education obtained by primary caregiver |
| Presence in Other Nutrition / Sanitation Groups | Whether respondent claims to be a part of women’s groups, breastfeeding clubs, or other social structures where nutrition and sanitation messages may be disseminated |
| Age of Caregiver | Respondent’s age |
| Water Access | Amount of time required for respondent to access nearest water source. |
| Distance to Health Facility | Distance (time and, if available, linear distance) from respondent household to nearest health facility/dispensary |
| Health Facility Quality | Whether health facility was open, staffed, and had medications available the last time respondent visited. |
| Progress Out of Poverty Index | Index of household economic well-being |
| Number of Children per Caregiver | Number of children caregiver has had experience caring for |

## IV.3. Subgroup Analysis

For all of the outcomes listed in Table 1, treatment effects will be estimated for the whole sample and for the priority subgroup of households with children under 2. In addition to these analyses, we will estimate heterogeneous treatment effects for subgroups defined by selected covariates to test specific links in the client’s Theory of Change:

Table 3: List of Subgroup Analyses

|  |  |
| --- | --- |
| Outcome | Interacting Covariate |
| Proper Breastfeeding Practice | Presence in Other Nutrition / Sanitation Groups |
| Proper Breastfeeding Practice | Age of toddler (whether 0 – 6 months or 6 – 24 months) |
| Health Facility Visits | Distance to Health Facility |
| Health Facility Visits | Health Facility Quality |
| Hand-washing Infrastructure | Water Access |
| Hand-washing practice | Water Access |

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## IV.4. Analytical Model

Weighted Least Squares will be the primary analytical technique used to estimate treatment effects in this evaluation (or Linear Probability Model when applied to binary variables). The effect of treatment on each of the outcomes listed Table 1 will be estimated by running the following regression:

**Base specification:**

Where:

* Yij denotes the outcome variable for household *i* in village *j*, which can be classified as:
  + Binary – Taking the value of 0 or 1
  + Percentage – Value between 0 and 1
  + Integer Scale – Integer between 0 and the maximum value on the integer scale
* Tj denotes the treatment status of kijiji *j* (1 for Treatment Group; 0 for Control Group)
* α’w denotes a vector of dummy variables corresponding to wards (with one ward omitted), which is 1 when household *i* is in ward *w* and 0 otherwise.
* εij denotes the household error term *i*, clustered at the kijiji-level to reflect the randomization process.
* \* denotes the sampling weights applied to each term in the regression equation, which are equal to the inverse probability of household *i* in village *j* being sampled, or 1/(number of sampled caregivers in kijiji *j*/number of eligible caregivers in kijiji *j*)

**Secondary specification:**

Where all terms are as defined above, plus:

* X’ij denotes a vector of covariates measured for each household *i* in kijiji *j*

For each of the subgroup analyses specified in Table 3, we will add the relevant interaction term to the regression equation specified above.

The Stata commands that will be used to estimate the stated models are as follows:

**Base specification:**

reg Sannut\_outcome treatment i.ward [pweight = 1/prob], cluster(village\_id)

**Secondary specification:**

reg Sannut\_outcome treatment covari i.ward [pweight = 1/prob], cluster(village\_id)

**Sub group analysis:**

reg Sannut\_outcome treatment covari treatment##c.groupvar i.ward [pweight = 1/prob], cluster(village\_id)

## IV.5. Presentation of results

Bar graphs showing mean value of each indicator including the 95% confidence interval will be created for both treatment and control group. Regression tables will be included as appendices in the final technical report.

## IV.6. Analysis of process data

The following data will be collected as part of the process evaluation:

1. Duration of caregiver meetings
2. Attendance of caregivers at both Sannut meetings
3. Observation of which Sannut messages were delivered during the caregiver sessions
4. Frequency of CHVs visits at household level to follow up on Sannut messages
5. Recall of what CHVs followed up during HH visit
6. Time between trigger session and caregiver meetings

The data will be analyzed along the following themes to provide information on causal links in the Theory of Change:

* **Mobilization:** How strong was the mobilization and were the correct caregivers identified to be part of the caregiver meetings?
* **Messages:** Were all the key Sannut messages delivered?
* **Participation:** Were the caregivers engaged and did they commit to action as part of behavior change?

# V. Limitations and Corrections to the analysis

## V.1. Partial compliance

Non-compliance can occur at two levels:

* At kijiji level with incorrect treatment of control kijijis or treatment kijijis not being treated. We expect minimal occurrence of this. Based on preliminary observations during the implementation process, this has been observed in less than 5% of the evaluation kijijis
* Sampled caregivers not attending the Sannut meetings. This has a higher likelihood of occurring since attendance at meetings as noted during process evaluation activities is at roughly 60%.

If non-compliance is non-negligible, we will estimate the treatment-on-the-treated effect by using instrumental variable regression, where we will use treatment assignment as an instrument for actual treatment.

## V.2. Outliers and Missing Values

Missing values can take the form of non-response (e.g. uncompleted surveys), partial response (e.g. “Don’t know” responses) or errors in the data. Minor and random missing values can be omitted from the analysis. If missing values are unexpectedly high, we may check the sensitivity of the complete case estimate with bounds analysis. However, we expect minimal missing data since the digital survey form includes constraints that require data to be entered before the enumerator can proceed with data collection.

## V.3. Multiple Hypothesis Testing Correction

In order to reduce the risk of incorrectly rejecting the null hypothesis (Type I error), we will adjust standard errors using the family-wise error rate. This adjustment treats hypothesis tests of similar outcomes as correlated rather than independent.[[19]](#footnote-19)

## V.4. Additional Hypothesis Testing

Additional analyses may be conducted following the conclusion of data collection if additional questions of interest arise. Any analyses that are not specified in this pre-analysis plan will be indicated and justified as such.

# Appendix I: Indicators and corresponding Survey Questions

The following table lists the questions that will be used to construct the various indicators of interest for Sannut. The indicators will be constructed as described in Table 1.

|  |  |
| --- | --- |
| Indicator | Survey Questions |
| Latrine Use | 1. The last time you defecated, did you use the latrine? |
| Latrine Structure and Maintenance | Latrine observations   1. Is there a hole for the cover? 2. Is the slab smooth and easy to clean? 3. Does the latrine have a structure that ensures privacy? 4. Does the latrine have a roof? 5. Is the latrine structure safe (i.e. does not appear that it would collapse)? 6. Is there a well-used footpath towards the latrine? 7. Are human feces visible on the latrine floor or slab? 8. Are there flies in or near the latrine? |
| Courtyard cleanliness | Courtyard observations:   1. Are human feces visible in the courtyard? 2. Are animal/poultry feces visible in the courtyard? 3. Is there trash that has attracted flies in the courtyard? 4. Is there stagnant water present in the courtyard? 5. Are animals present in the courtyard? (Which ones?) 6. Is there a specific surface for the child to play on? 7. Is the surface clean? 8. Is the general play area clean? |
| Self-reported Disposal of Child Feces | 1. What kind of diapers/nappies do you regularly use for the youngest child? 2. If disposable diapers, the last time the youngest child passed stools, what was done to dispose of diapers and stools? 3. If reusable nappy, the last time the youngest child passed stools, what was done to dispose of stools? 4. If reusable nappy, the last time the youngest child passed stools, what was done to dispose of the waste water? 5. If the child does not use diapers/nappies, the last time the youngest child passed stools, what was done to dispose of stools? |
| Proper Breastfeeding Practice | For children below 6 months:   1. Is the child currently being breastfeed? 2. Yesterday, was the child breastfed whenever (s)he wanted or on a fixed schedule? 3. In the first three days after delivery, was the child given anything to drink or eat other than breast milk? 4. Is the child currently being fed anything other than breast milk?   For children between 6 months and 24 months? (ask for youngest child in this age bracket)   1. Is child currently being breastfed? 2. How many times a day do you breastfeed the child? 3. How months old was the child when you introduced other foods beyond breast milk? |
| Health Facility Visits | Child health booklet observations:   1. When was Vitamin A last administered? 2. When was deworming medication last administered? 3. When was the last time you took your child to the health facility? |
| Handwashing Infrastructure | 1. Is there a place for washing hands? 2. Is there water? 3. What hand washing materials are observed? 4. Is there evidence of handwashing station recently being used (e.g. wet ground, presence of water)? |
| Handwashing Practice | 1. Approximately, how often per day do you usually wash your hands? 2. When washing hands, what do you use? 3. After which activities do you regularly wash your hands? |
| Child Diarrhea | Ask for all children between 6 months and two years:   1. Has the child had diarrhea in the past two weeks? |
| Sanitation Knowledge | 1. In your opinion, what are the ways to maintain a sanitary environment inside the home to prevent contamination of food from fecal matter? 2. What are some practices that could cause a person to get diarrhea? 3. What are some practices that could prevent getting diarrhea from water? 4. In your opinion, when do you think are the critical times to wash your hands? 5. In your opinion, what is the safest way to dispose of your child’s stools? |
| Nutrition Knowledge | 1. In your opinion, what are the benefits of feeding your child breast milk? 2. How long after birth should a child be put to breast? 3. For how long should a child be fed on breast milk without being fed any other food or drink? 4. At what age in months should one first introduce semi-solid or solid food to the child? |

1. In our literature review and extensive consultation with stakeholders, we did not find any publications of integrated sanitation and nutrition programs either successfully or unsuccessfully implemented [↑](#footnote-ref-1)
2. Curtis, Valerie, Sandy Cairncross, and Raymond Yonli. 2000. “Domestic Hygiene and Diarrhoea—Pinpointing the Problem.” Tropical Medicine and Internal Health 5 (1): 22–32. [↑](#footnote-ref-2)
3. Marquis, G. S., G. Ventura, R. H. Gilman, E. Porras, E. Miranda, L. Carbajal, et al. 1990. “Fecal Contamination of Shanty Town Toddlers in Households with Non-corralled Poultry, Lima, Peru.” American Journal of Public Health 80 (2): 146–49. [↑](#footnote-ref-3)
4. Pickering, A. J., T. R. Julian, S. J. Marks, M. C. Mattioli, A. B. Boehm, K. J. Schwab, et al. 2012. “Fecal Contamination and Diarrheal Pathogens on Surfaces and in Soils among Tanzanian Households with and without Improved Sanitation.” Environmental Science & Technology 46 (11): 5736–43. [↑](#footnote-ref-4)
5. Mara, Duncan, Jon Lane, Beth Scott, and David Trouba. 2010. “Sanitation and Health.” PLoS Medicine 7 (11): 1359. [↑](#footnote-ref-5)
6. Bhandari, Nita, Rajiv Bahl, Sarmila Mazumdar, Jose Martines, Robert E. Black, and Maharaj K. Bhan. "Effect of Community-based Promotion of Exclusive Breastfeeding on Diarrhoeal Illness and Growth: A Cluster Randomised Controlled Trial." *The Lancet* 361.9367 (2003): 1418-423. [↑](#footnote-ref-6)
7. Haider, Rukhsana, Ann Ashworth, Iqbal Kabir, and Sharon Ra Huttly. "Effect of Community-based Peer Counsellors on Exclusive Breastfeeding Practices in Dhaka, Bangladesh: A Randomised Controlled Trial." *The Lancet* 356.9242 (2000): 1643-647. [↑](#footnote-ref-7)
8. Morrow, Ardythe L., M. Lourdes Guerrero, Justine Shults, Juan J. Calva, Chessa Lutter, Jane Bravo, Guillermo Ruiz-Palacios, Robert C. Morrow, and Frances D. Butterfoss. "Efficacy of Home-based Peer Counselling to Promote Exclusive Breastfeeding: A Randomised Controlled Trial." *The Lancet* 353.9160 (1999): 1226-231. [↑](#footnote-ref-8)
9. Aidam, Bridget, Rafael Pérez-Escamilla, and Anna Lartey. "Lactation Counseling Increases Exclusive Breast-Feeding Rates in Ghana." *The Journal of Nutrition* 137.7 (2005): 1691-695. [↑](#footnote-ref-9)
10. Bhutta, Zulfiqar A., et al. "Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?." *The Lancet* 382.9890 (2013): 452-477. [↑](#footnote-ref-10)
11. The ward is an administrative unit below the sub-county and above the kijiji. [↑](#footnote-ref-11)
12. PATUMA (Pamoja Tujikinge Magonjwa) is a county-wide CLTS program being implemented by the Kitui County Government’s Ministry of Health and Sanitation targeting roughly 2,100 kijijis across the county. UNICEF is a partner to the county in implementation of this program by providing technical and implementation support [↑](#footnote-ref-12)
13. The intervention in this study targets messaging on the importance of taking infants to health facilities for follow-up visits, and this study has regular visits as one outcome variable. It is assumed that if a health facility is further than 10km away, there are greater barriers than knowledge – which this intervention does not target - that prevent a caregiver from taking their toddler for necessary check-ups. [↑](#footnote-ref-13)
14. Population Services Kenya is an NGO, contracted by the UNICEF KCO Nutrition Team, that conducts household outreach regarding infant nutrition. Due to the similarity in intervention content, the six wards where PSK is targeting its outreach efforts will be omitted from the sample frame. The excluded wards include Mutomo/Kibwea, Athi, Kanziko, Kyuso, Tseikuru, and Tharaka. [↑](#footnote-ref-14)
15. This study investigates the effect of the intervention on specific ODF related indicators and is less relevant in areas that are already mostly ODF. [↑](#footnote-ref-15)
16. CLTS is an approach that is applied primarily to rural communities. [↑](#footnote-ref-16)
17. Power calculations available upon request. This sampling strategy will enable us to detect meaningful effect sizes for the whole sample and for households with children under 2, but not separately for households with children between 2 and 5. [↑](#footnote-ref-17)
18. Weighted Least Squares will be used to estimate the population average treatment effect in the whole sample, whereas Ordinary Least Squares will be used to estimate the treatment effect among households with children under 2. For binary outcomes, this approach is equivalent to using the Linear Probability Model. [↑](#footnote-ref-18)
19. http://statistics.berkeley.edu/sites/default/files/tech-reports/633.pdf [↑](#footnote-ref-19)