Evaluation of the *Nigeria Community Infant and Young Child Feeding (C-IYCF) Counselling Package*

Annex 2

EVALUATION METHODS

JUNE 2018

USAID FROM THE AMERICAN PEOPLE

unicef

SPRING
Strengthening Partnerships, Results and Innovations in Nutrition Globally

TABLE OF CONTENTS

ACRONYMS

ANC	antenatal care
ARV	antiretroviral drug(s)
BMI	body mass index
CARE	Cooperative for Assistance and Relief Everywhere
CAS	complex adaptive systems
C-IYCF	community infant and young child feeding
CHEW	community health extension worker
CMAM	community management of acute malnutrition
DPHC	Director of Primary Healthcare
EA	enumeration area
ECD	early childhood development
ENN	Emergency Nutrition Network
FCT	Federal Capital Territory
FMOH	Federal Ministry of Health
IFE	infant feeding in emergencies
IASC	Inter-Agency Standing Committee
IRB	Institutional Review Board
IYCF	infant and young child feeding
IYCN	infant and young child nutrition
LGA	local government area
M&E	monitoring and evaluation
MIYCN	maternal, infant, and young child nutrition
MNP	micronutrient powder
NBS	National Bureau of Statistics
NDHS	Nigeria Demographic and Health Survey

NFP	Nutrition Focal Person
NHREC	National Health Research Ethics Committee of Nigeria
NPC	National Planning Committee
NPP	Nutrition Policy and Practice
PAHO	Pan-American Health Organization
PHC	primary healthcare
PI	principal investigator
PIP	program impact pathways
SBCC	social and behavior change communications
SMOH	State Ministry of Health
SPRING	Strengthening Partnerships, Results, and Innovations in Nutrition Globally (Project)
UNEG	United Nations Evaluation Group
UNICEF	United Nations Children's Fund
URC	University Research Co., LLC
URC/CHS	University Research Co., LLC/ Center for Human Services
USAID	United States Agency for International Development
VHW	village health worker
WDC	ward development committee
WHO	World Health Organization

BACKGROUND

The main purpose of this study was to evaluate the effectiveness of the *Community Infant and Young Child Feeding Counselling Package* that had been adapted for the local context in Nigeria and implemented at scale[1] in an environment supportive of its design, management, technical assistance, and monitoring. Specific study aims and research questions relevant to each were as follows:

1. **Assess planning and implementation of the *C-IYCF Counselling Package*.**
   - Was planning for implementation of the *C-IYCF Counselling Package* adequate? Did it appropriately and adequately take into consideration, involve, and engage key stakeholders, including community members and community volunteers?
   - Did implementation of the *C-IYCF Counselling Package* go according to plan and reach the target populations?
   - What were the costs of implementing the *C-IYCF Counselling Package*?

2. **Evaluate the impact of the *C-IYCF Counselling Package* on MIYCN knowledge and counselling and communication skills among health workers and community volunteers.**
   - What impact did the implementation of the *C-IYCF Counselling Package* have on MIYCN knowledge, counselling and communication skills, problem-identification and problem-solving capacities, group facilitation skills, and monitoring/data collection abilities among health workers and community volunteers?

3. **Evaluate the impact of the *C-IYCF Counselling Package* on MIYCN knowledge, attitudes, and practices among pregnant women and mothers of children under two.**
   - How much did MIYCN knowledge, attitudes, and beliefs among caregivers change as a result of implementation of the *C-IYCF Counselling Package*?
   - What was the impact of the *C-IYCF Counselling Package* on recommended breastfeeding practices (early initiation, exclusive breastfeeding, and continued breastfeeding)?
   - What was the impact of the *C-IYCF Counselling Package* on complementary feeding practices (introduction of solid, semi-solid or soft foods, minimum dietary diversity, minimum meal frequency) and on complementary feeding outcomes (minimum acceptable diet, nutrient adequacy of the diet)?

4. **Assess environmental or contextual factors that may have enabled or limited the impact of the *C-IYCF Counselling Package*.**
   - How was the agenda for nutrition, IYCF, and implementation of the *C-IYCF Counselling Package* set?

[1] We defined 'at scale' implementation as implementation at a large enough geographic area and population considered to be adequate for assessing replicability and generalizability to implementation at the national level.

- Did the policy framework and systems (including human resource, information, and referral systems) enable or hamper the success of the *C-IYCF Counselling Package*?
- Was there adequate leadership or champions for nutrition who supported implementation of the *C-IYCF Counselling Package* in the intervention site?
- Was there social support for nutrition and IYCF among key informants and influential persons in intervention areas?

STUDY DESIGN

The study followed a quasi-experimental design using a mixed-methods approach to answer the research questions. Quantitative and qualitative data were collected at baseline and again at endline, after 18 months of program implementation, using a number of different data collection methods described below. While the facility assessment, the semi-structured interviews, as well as the survey of community volunteers and health workers were longitudinal (i.e., every attempt was made to collect data from the same individuals at baseline and endline), the maternal survey captured repeated cross-sectional samples of pregnant women and mothers of children under age 2.

Study Location

The study was conducted in one intervention LGA (Kajuru) and one comparison LGA (Kauru) in Kaduna State. UNICEF and the State Ministry of Health (SMOH) are in the process of planning to implement the C-IYCF program in Kauru LGA.

The two LGAs were selected in close consultation with local authorities based on the following criteria:

- Limited implementation of intensive community-based nutrition/IYCF interventions (including C-IYCF and CMAM). This meant that both intervention and comparison LGAs had limited IYCF services delivered through the health care system.
- Relatively food-secure districts where the main nutrition-related causes of undernutrition for most households were related to suboptimal practices and behaviors, and not to severe food insecurity.
- No other recent, ongoing, or planned complementary feeding interventions for food-insecure populations such as food assistance, supplements, and other food security programs or social protection schemes.
- Socially stable environments where the proposed evaluation study could be conducted.
- Similar socio-demographic characteristics.

At the time of selection, there were 42 health facilities (including both public and private) in the intervention LGA[2] and an estimated population of 140,433 (approximately 9,550 children under two), located in ten wards or LGA sub-divisions. In the comparison LGA there were 48 health facilities and an estimated population of 215,361 (approximately 14,645 children under two), located across eleven wards.

[2] Following a rapid facility assessment, we determined that there were 55 health facilities in the intervention LGA.

Intervention

Implementation of the *C-IYCF Counselling Package* began in Nigeria in 2011 under the leadership of the Federal Ministry of Health (FMOH) of the Government of Nigeria with adaptation of the package to the local context. This process was supported by UNICEF/Nigeria, the USAID-funded Infant and Young Child Nutrition (IYCN) project, and, starting in 2013, the USAID-funded Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project. Versions of the C-IYCF training materials were printed in English and in six local languages in 2014.[3]

The intervention studied here began with the sensitization of key stakeholders in the state and LGA. The intervention was designed to rapidly achieve full coverage of the intervention LGA and be replicable and scalable. At the same time, implementation was well-supported, so that outcomes were assessed under conditions of "best practices" as much as possible in terms of management, technical assistance, oversight, monitoring, and supervision.

The theorized pathway to improving maternal, infant, and young child nutrition (MIYCN) behaviors through implementation of the C-IYCF program was presented in a program impact pathway (PIP) diagram. This PIP was updated over the course of the study. The initial PIP can be found in Annex 1 while the final PIP can be found in the final report, along with additional details on the planning and implementation processes followed.

Duration of Implementation

SPRING, UNICEF, and the FMOH began sensitization meetings in October 2014. However, these meetings focused on opening the door to data collection. Implementation began in earnest in May 2015 with the training of health workers and health authorities and additional sensitization meetings with LGA authorities. Community volunteers were trained in June 2015 and community-based activities, including sensitizations, mobilizations, support groups, home visits, community events, and dialogues, began in July 2015. They continued with support from UNICEF through December 2016, for 18 months, at which time the endline evaluation was conducted and responsibility for funding and implementing community-based IYCF activities was handed over to the LGA.

Study Subjects

Study subjects included a range of people from the federal, state, and LGA levels who we believed were likely to influence MIYCN practices and/or the success of the implementation of the *C-IYCF Counselling Package* (e.g., those responsible for approving and/or supervising activities and budgets/expenditures for nutrition-related activities). In addition, we interviewed those in charge of all health facilities in the intervention LGA, surveyed all health authorities and workers trained as well as community leaders and community volunteers. All pregnant women and mothers and caregivers of children under 2 were considered eligible for participation in the C-IYCF program.

[3] The *Nigeria Community and Facility Infant and Young Child Feeding Counselling Package* can be found here: http://www.spring-nutrition.org/publications/training-materials/nigeria-community-and-facility-infant-and-young-child-feeding

Study Indicators

Process variables: Process variables tracked throughout implementation include:

- Number of people reached through support groups, disaggregated by type and whether or not the person was reached for the first time
- Number of people reached through home visits, disaggregated by type and whether or not the person was reached for the first time
- Number of people referred to health facilities
- Number of supervision visits conducted, by level

In addition, the health worker, community volunteer, and maternal surveys provided information on perceived usefulness of C-IYCF program activities.

Outcome variables: The key outcome variables[4] assessed included:

- Quantity of food consumed during pregnancy and lactation
- Early initiation of breastfeeding
- Exclusive breastfeeding under 6 months
- Predominant breastfeeding under 6 months
- Continued breastfeeding at 1 year
- Continued breastfeeding at 2 years
- Age of introduction of solid, semi-solid or soft foods
- Dietary diversity
- Meal frequency
- Consumption of iron-rich or iron-fortified foods
- Children ever breastfed
- Age-appropriate breastfeeding
- Duration of breastfeeding
- Cost of implementation
- Cost per contact made

In addition, the following indicators of nutritional status were calculated using the World Health Organization (WHO) growth standards: body mass index (BMI) of pregnant and lactating mothers, height-for-weight z-scores, weight-for-age z-scores, and weight-for-height z-scores. These were reported as mean values and also by standardized categories of nutritional status.

Independent variable: The key independent variable was LGA allocation (intervention, comparison).

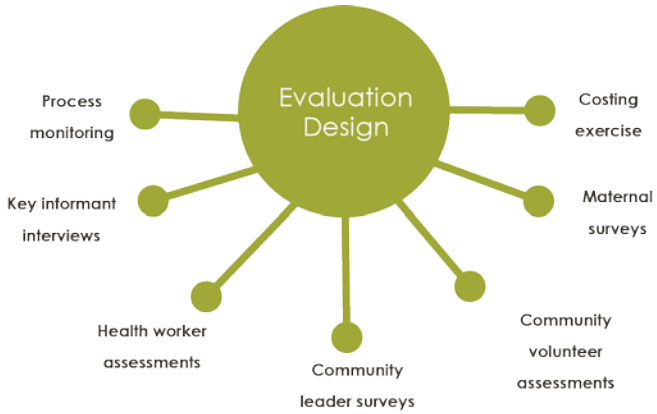
[4] Indicators for Assessing Infant and Young Child Feeding Practices. Part 2: Operational Guide on Measurement (2010) http://www.who.int/entity/nutrition/publications/infantfeeding/9789241599757/en/index.html

Confounders: The following potential socioeconomic and demographic confounders were assessed at each time point: maternal age, parity, marital status and education, maternal role in decision-making, maternal mobility, maternal control of resources, household assets, and household size and composition.

STUDY METHODS

As indicated above, we used mixed methods (see figure 1). In this section we describe the methods for each data collection activity employed, including a description of the tools, sample, sample selection, and data collection procedures. All data collection tools can be found at https://www.spring-nutrition.org/publications/tools/evaluation-nigeria-community-infant-and-young-child-feeding.

Figure 1. Data Collection Methods



Program Monitoring

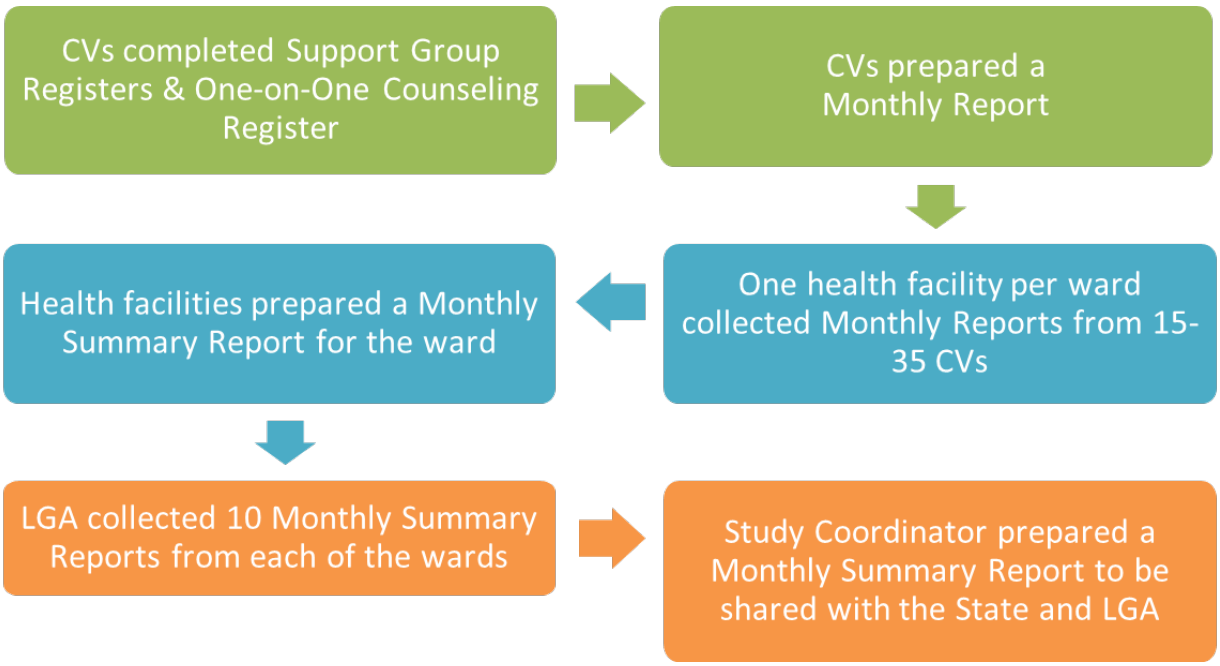
Description: Throughout implementation, program processes were tracked, including people trained (health authorities, health facility staff, and community volunteers), community events conducted, and support group meetings held, as well as target population reached through support group meetings and home visits. Standard forms were used for these monitoring activities. The LGA authorities collected and aggregated these data for program management. The research team collected aggregated data on a quarterly basis from the LGA authorities.

Sample: All support group meetings and home visits, as well as the people reached through these meetings and visits, were tracked by community volunteers.

Data collection tools: Data collection tools included the C-IYCF Support Group Register, Community Volunteer Monthly Summary Form, Health Facility Monthly Summary Form, and LGA Monthly Summary Form.

Data collection procedures: Community volunteers completed a register for each support group conducted and then summarized all support groups and home visits conducted each month on the Community Volunteer Monthly Summary Form. This form was submitted to a nearby health facility every 1 to 2 months during monthly review meetings. Staff at ten of the C-IYCF health facilities aggregated what was reported by the community volunteers in their ward and submitted this summary to the LGA during the LGA-level monthly review meetings. The LGA then aggregated that which was reported by these health facilities. Figure 2 below depicts this flow of data.

Figure 2. C-IYCF Monitoring Data Flow



Key Informant Interviews

Description: At baseline, to assess the environment or context in terms of how it "enabled" or hampered success of the C-IYCF program in the intervention LGA (Study Objective 1), we conducted structured interviews with key informants from all levels. During the endline, key informant interviews were semi-structured, with more open-ended questions and probes.

Sample: As indicated above, key informants were selected purposively from the national, state, and LGA levels at baseline and endline (table 1). At the national and state level, these included ministry and department chairs. At the LGA level, these included key personnel responsible for financing, implementation, and monitoring of health programs. At endline, additional key informants were identified by other key informants during interviews.

Data collection tools: Several structured interview guides were used at baseline; all guides were slightly different for each level of respondent interviewed. At endline, tools were semi-structured interview guides that included more open-ended questions and probes. These were based on the structured interview guides used at baseline, but included questions on program implementation and the potential for scale-up and sustainability.

Data collection procedures: At baseline, interviews with national, state, and LGA leaders were conducted in their respective offices by the study coordinator, accompanied by a SPRING co-principal investigator (PI) at the national level. At endline, semi-structured interviews with national, state, and LGA leaders were conducted in their respective offices by a qualitative research specialist hired by SPRING. They were conducted in English.

Health Worker Assessments

Description: We surveyed health authorities and workers at baseline and at endline to assess the success and achievements of C-IYCF program processes and implementation (Study Objective 2), while also further assessing the factors enabling or hampering the success of the program (Study Objective 1).

Sample: All health facility staff and authorities who were selected to participate in the C-IYCF training were asked to complete pre- and post-training assessments (table 1). They were also asked to complete a similar self-assessment at endline.

Table 1. Sample Size and Background Characteristics of Health Workers, by Time Point

	Pre-Training		Endline	
	n	%	n	%
Sex	**N=65**		**N=67**	
Male	14	21.5	13	19.4
Female	51	78.5	54	80.6
Current role/position in health facility	**N=65**		**N=67**	
Nurse/midwife	8	12.3	5	7.5
Community health extension worker	35	53.9	35	52.2
Junior community health extension worker	14	21.5	16	23.9
Community health officer	7	10.8	6	9.0
Other	1	1.5	5	7.5
Years in role/position in health facility	**N=65**		**N=67**	
Years, mean (SD)	8.6 (5.7)		11.3 (7.2)	

Data collection tools: The baseline assessment included questions related to trainees' confidence in their ability to train, monitor, mentor/supervise, and support community volunteers. The endline assessment included most of those same questions asked at baseline, with the addition of questions on perceptions related to the C-IYCF program.

Data collection procedures: At baseline, these assessments were self-administered immediately prior to and after the training of health workers and health authorities. The assessments were distributed and collected by master trainers conducting the trainings. At endline, these assessments were administered by National Bureau of Statistics (NBS) enumerators using tablet computers and, thereby, entered automatically into the study's management information system.

Community Leader Surveys

Description: Because community leaders play an important role in enabling or limiting the adoption of MIYCN practices, we interviewed community leaders in the intervention LGA.

Sample: Community leaders included Ward Development Committee (WDC) leaders, 1–2 village heads, 1–2 chiefs, 1–2 religious leaders, 1–2 women leaders, and 1–2 youth leaders. Community-level key

informants were drawn from all wards in the intervention LGA. The total number and type of community leaders interviewed at each time point are presented in table 2 below.

Table 2. Sample Size and Background Characteristics of Community Leaders, by Ward and Time Point

	Baseline		Endline	
	n	%	n	%
Ward of residence	**N=78**		**N=92**	
Afogo	8	10.3	8	8.7
Buda	8	10.3	12	13
Idon	8	10.3	9	9.8
Kajuru	8	10.3	9	9.8
Kallah	7	9.0	9	9.8
Kasuwa Magani	7	9.0	9	9.8
Kufana	8	10.3	8	8.7
Maro	8	10.3	8	8.7
Rimau	8	10.3	12	13
Tantatu	8	10.3	8	8.7
Sex	**N=78**		**N=92**	
Male	--	--	79	85.9
Female	--	--	13	14.1
Age (years)	**N=78**		**N=92**	
20–39	23	29.5	23	25.6
40–49	24	30.0	21	23.3
≥ 50	31	39.7	46	51.1

Data collection tools: A survey tool covering knowledge and attitudes related to MIYCN practices and programming was used. The endline tool also included questions on participation in and perceptions of the C-IYCF program.

Data collection procedures: Interviews with community leaders were conducted by trained enumerators from the NBS in diverse settings, including households, health facilities, C-IYCF training locations, and local community focal points. Interviews were conducted in English at the national, state, and LGA levels and in either English or Hausa at the community level. At baseline, data were collected using paper-based forms; at endline, data were collected using tablet computers.

Community Volunteer Surveys

Description: We surveyed community volunteers prior to the training and shortly thereafter, at baseline, and then again at endline to evaluate the outcomes of implementation of the *C-IYCF Counselling Package* on counselling and communication skills and knowledge of IYCF among community volunteers (Objective 3).

Sample: All community volunteers selected to participate in the C-IYCF training were included in the community volunteer surveys (table 3).

Table 3. Sample Size and Background Characteristics of Community Volunteers, by Ward and Time Point

	Pre- and Post-Training		Endline	
	n	%	n	%
Ward of residence	**N=237**		**N=238**	
Afogo	25	10.5	24	10.1
Buda	33	13.9	36	15.1
Idon	16	6.8	16	6.7
Kajuru	17	7.2	27	11.3
Kallah	26	11	26	10.9
Kasuwa Magani	32	13.5	32	13.4
Kufana	35	14.8	24	10.1
Maro	17	7.2	18	7.6
Rimau	16	6.8	16	6.7
Tantatu	20	8.4	19	8.0
Sex	**N=237**		**N=238**	
Male	74	31.2	61	25.6
Female	163	68.8	177	74.4
Age (years)	**N=234**		**N=238**	
≤19	10	4.3	7	2.9
20–24	60	25.6	49	20.6
25–29	52	22.2	55	23.1
30–34	42	17.9	48	20.2
≥ 35	31	21.8	79	33.2
Don't know	19	8.1	0	0
Mean (SD)	**29.2 (7.9)**		**31.6 (9.2)**	
Religion	**N=237**		**N=238**	
Christian	179	75.5	--	--

	Pre- and Post-Training		Endline	
	n	%	n	%
Muslim	58	24.5	--	--
Primary language	**N=237**		**N=238**	
Hausa	118	50.0	--	--
Adara	97	41.1	--	--
Other	21	8.9	--	--

Data collection tools: At baseline, structured interview tools were developed to explore community volunteers' knowledge and beliefs related to IYCF, as well as their confidence to perform the duties of a community volunteer. At endline, the survey tool included a similar set of questions, as well as questions on perceptions related to the C-IYCF program.

Data collection procedures: The community volunteer surveys were administered by NBS enumerators. At baseline, nominated community volunteers were invited to attend an initial orientation meeting held in health facilities or some other community setting. During that orientation meeting, each nominated community volunteer was interviewed (if and only when informed consent was given) in a private or semi-private space within the health facility or community meeting room. At the completion of the training, community volunteers were asked to return to the health facility or community setting to launch community activities and to participate in a second interview. Similarly, at endline, community volunteers were asked to return to the health facility or community center to participate in a final interview. However, at endline, data were collected using tablet computers and, thereby, automatically entered once collected.

Maternal Surveys

Description: Objective 4 of the study was met and the related research questions were answered by comparing differences between baseline and endline in the intervention site with the differences observed over the same time period in the comparison site. Holding constant, through statistical analysis, other factors known to affect MIYCN practices, this comparison determined the effectiveness of the *C-IYCF Counselling Package*. To measure IYCF knowledge and practices, a survey was conducted at baseline (prior to community-level trainings and implementation) and again at the end of program implementation (i.e., 18 months after community volunteers were trained and support groups were formed) among pregnant women, mothers of children under 6 months of age, and mothers/primary caregivers of children 6 to 23 months of age. This assessment also allowed the research team to assess coverage in the intervention and reference LGAs and intervention contamination, if any, in the comparison LGA.

Sample: All women in the intervention and comparison LGAs were eligible for participation in the survey if they were pregnant and/or had a living child under 2 years of age, and were at least 16 years old at the time of the survey. It is important to note that in Nigeria, as in many countries, mothers between 16 and 18 years of age are considered "adults" for consent purposes. Thus, approval from their parents for

participation in the study was not required. Mothers of children born prematurely or with medical conditions requiring special IYCF considerations were not included in the survey.

At baseline and endline, data were collected among representative samples from the intervention and comparison LGAs. Sampling followed a single stage cluster design. In the first stage, the clusters or enumeration areas (EAs) were selected using systematic random sampling method. In each EA, the NBS then completed a household enumeration exercise to generate the list of households with a pregnant woman or a woman with a child under 3 years of age.[5] All women meeting the criteria were included in the study, thus some households contribute more than one respondent. Likewise, all children from selected mothers who were reported to be under 3 years of age were included in the study.

The sample size was estimated based on expected effect sizes as reported for infant feeding behaviors attained through similar interventions implemented at a smaller scale in other areas of sub-Saharan Africa (e.g., Ethiopia) (White and Mason 2012). The statistical parameters were defined in the following way: a) a two-sided α level of confidence of 0.05; b) a power of at least 80 perfect; and c) the desired effect size was set at 10 percentage-points. The expected prevalence of the outcome of interest in the intervention and comparison areas were considered to be 50 percent, 17 percent, and 36 percent respectively for the three population groups (i.e., children 0 to 5 months; children 6 to 23 months; and pregnant women). Using these parameters, the sample size estimated was 400, 320, and 442 for each of the three population groups from each of the study arms (i.e., intervention and comparison) at each time point (i.e., baseline and endline) using simple random sampling method for drawing the sample. Design effects for nutritional indicators given in the *2013 Nigeria Demographic and Health Survey* (NDHS) range between 1.8 and 2.1 (see page 288; Annex A). We assumed a design effect of 2, took into account the need to adjust for clustering effects related to the sampling design, and a 10 percent non-response rate. It was then determined that the sample size required was 800 pregnant women, 640 mothers of children ages 0 to 5 months, and 884 mothers of children ages 6 to 23 months for each time point (i.e., baseline and endline) and each site (i.e., intervention LGA and comparison LGA). A table of the between-group effect sizes that can be expected to be detected for each of the study's primary objectives based on the proposed sample size can be found in Table 4.

Table 4. Sample Size Required for a 10 Percent Design Effect, by Priority Indicators

Indicators (Source of 2013–2014 Figures)	2013–2014 Figures	Sample Size Required to Detect 10% Effect
Priority indicators for pregnant women		
BF within 1 hour of birth (Kaduna 2013 NDHS)	35.6%	**884**
BF within 1 hour of birth (Kaduna 2014 SMART)	19.3%	684
Priority indicators for mothers with children 0-5 months old		
BF within 1 hour of birth (Kaduna 2013 NDHS)	35.6%	**884**
BF within 1 hour of birth (Kaduna 2014 SMART)	19.3%	684

[5] Ultimately, only mothers with children under 2 years of age were included in the study. Mothers were asked a series of questions to determine the child's age as accurately as possible.

Indicators (Source of 2013–2014 Figures)	2013–2014 Figures	Sample Size Required to Detect 10% Effect
Exclusive breastfeeding under age 6 months (Nigeria 2013 NDHS)	17.0%	640
Exclusive breastfeeding at age 4–5 months (Nigeria 2013 NDHS)	10.0%	487
Priority indicators for mothers with children 6-23 months old		
Continued breastfeeding at 1 year (Nigeria 2013 NDHS)	84.0%	382
Introduction of solid, semisolid, or soft foods (6-8 months) (Nigeria 2013 NDHS)	67.0%	744
Continued breastfeeding at 2 years (Nigeria 2013 NDHS)	35.0%	**880**
4+ food groups (Kaduna 2013 NDHS)	18.4%	667
Minimum meal frequency (Kaduna 2013 NDHS)	87.8%	273
With 3 IYCF practices (Kaduna 2013 NDHS)	14.3%	584
Minimum acceptable diet (Kaduna 2014 SMART Survey)	5.0%	356
Vitamin A rich foods in last 24 hours (6–23 months) (Kaduna 2013 NDHS)	56.6%	867
Iron rich foods in last 24 hours (6–23 months) (Kaduna 2013 NDHS)	47.2%	913
Soap and water available where place for hand washing was observed (Kaduna 2013 NDHS)	29.5%	831

To determine the number of EAs that we would need to select in each LGA, we used the following parameters: 1) average population size of the clusters/EAs; 2) fraction of the population who were 0 to 5 months of age; 3) fraction of the population who were 6 to 23 months of age; and 4) fraction of population who were currently pregnant. The average EA population size for the 2006 census was obtained from the *Nigeria Demographic and Health Survey 2013 Final Report* (page 378; table B.1; Annex B). The rest of the population parameters were estimated from the household population data set of the NDHS 2013. Using these population parameters (for the country), in each EA the average number of households with children 0 to 5 months, children 6 to 23 months, and pregnant women would be 3.6, 11.1, and 5.8, respectively. Therefore, to achieve the sample size proposed, we randomly sampled 178 EAs per group. [6]

The total samples drawn from the intervention and comparison LGAs at each time point are presented in table 5.

[6] At baseline, anthropometric data were only collected in one third (60) of the EAs selected for the maternal survey. At endline, anthropometric data will be collected among all pregnant women, mothers, and their children under 2.

Table 5. Total Sample, by Location and Time Point

	Baseline		Endline	
	Intervention LGA	Comparison LGA	Intervention LGA	Comparison LGA
Women*	2,228	2,554	3,055	4,399
Pregnant women	550	850	771	1,350
Mothers** of children under two years	1,748	1,777	2,451	3,414
Children	1,760	1,783	2,343	3,126
<6 months old	531	580	731	944
6-12 months old	473	473	628	878
13-18 months old	438	508	556	792
19-24 months old	318	222	428	512

* The sum of pregnant women and mothers does not sum to the total number of women since some women were both pregnant and mothers of children under 2.

** This includes some primary caregivers who were not the biological mother of the child. At endline, 12 in the intervention LGA and 48 in the comparison LGA were the primary caregivers, not biological mothers. At baseline, we did not confirm biological relationship between respondent and child.

Data collection tools: A structured household roster and interview tools for pregnant women and mothers of children under 2 were used at baseline and at endline. During the interviews for this survey, pregnant women and mothers were asked to respond to standard modules to assess their IYCF nutrition knowledge and practices, as well as socioeconomic and demographic characteristics. If they were unable to remember their child's or children's birth dates, mothers were asked to show the birth card(s) of their child/children to obtain their child's/children's birthweight(s). In addition, anthropometric measurements of women and children under 2 were collected and recorded.

At endline, to assess exposure to the intervention, women were also asked to report the number of times they were provided with IYCF counselling. They were asked to report when, where, how (e.g. group vs. individual) and who provided the counselling. They were also asked to report on what advice they were given, whether or not they followed it, and whether or not they found it useful.

Prior to implementation of the survey, the questionnaire was pre-tested by the NBS, with support from the co-PIs, with approximately 15 mothers following an iterative feedback process. This exercise was done prior to training the NBS data collection team (enumerators and supervisors) in both paper-based and tablet-based formats. During trainings at both baseline and endline, the tools were reviewed and tested during field practice. As needed, tools and translation were revised.

Data collection procedures: Baseline interviews with women were conducted by the NBS enumerators, all of whom spoke the local language. All anthropometric measurements were taken following standard procedures (WHO 2010) in duplicate; a third measure was taken if the first two measures differed. Similar data collection methods were used at endline. At baseline, the data were collected using paper-based forms while at endline tablet computers were used to expedite the data entry process.

In each ward the data collection team did the following:

- Administered the health facility survey (baseline only) and community volunteer survey (organized and conducted at the local health facility, prior to the training, after the training, and at endline). [intervention LGA only]
- Conducted health worker surveys (endline only). [intervention LGA only]
- Interviewed community leaders (baseline and endline). [intervention LGA only]
- Conducted a household enumeration using a household roster tool to identify pregnant women and mothers of children under 3 years of age. [intervention and comparison LGAs]
- Conducted the maternal survey, starting with the household roster. Anthropometrists accompanied interviewers to take anthropometric measurements of eligible women and children. [intervention and comparison LGAs]

Cost Study

Description: In order to determine the total cost of implementing the *C-IYCF Counselling Package* and the cost-effectiveness of the program, expenditures related to all C-IYCF program activities were carefully tracked. Expenditures included:

- Capacity building costs: venue; food; transportation for trainers, LGA staff, health workers, and community volunteers to and from the trainings;[7] equipment and materials (facilitators' guide, participants' manual, mats, stationary), and payment of trainers.
- Mobilization and sensitization at state, LGA, and community levels: transportation for the facilitators and participants to and from mobilization and sensitization events, refreshments provided to health workers and community volunteers during monthly review meetings, materials (C-IYCF brochures), and payment for facilitators.
- Support group meetings and home visits: print materials (counselling cards, key message booklet, and brochures).
- Monitoring and review meetings:[8] refreshments and transportation to and from the monthly review meetings for facilitators and participants.
- Supportive supervision: transportation for the study coordinator, state, and LGA monitors, and health facility staff to conduct supportive supervision visits of health facilities and community volunteers, materials (supervision, mentoring, and monitoring manual and supervision tools).

The cost study did not include the cost of adapting the package to the Nigerian context, training master trainers, or planning implementation; nor did we include the cost of any research activities associated with this evaluation, including the salaries or level of effort of the study team. We also did not include the cost (financial, opportunity, and in-kind) of time spent by state and LGA staff, health workers and community volunteers in implementing the program, time spent by mothers and caregivers participating in the

[7] Trainings included the 6-day C-IYCF training for LGA staff, health authorities, and health workers; the 3-day C-IYCF training for community volunteers, and the 1-day training for health facility staff on new monitoring and evaluation forms. Though the 1-day training for health facility staff on new monitoring and evaluation forms occurred in March 2016 they were combined with the initial training costs as would be the case if the program were to be repeated.

[8] This includes one longer monthly review meeting when community volunteers were oriented to the new monitoring and evaluation forms.

program, or costs incurred by community members to travel to and from program activities. The exclusion of the time and salary of state and LGA staff as well as health workers was based on the assumption that these activities are part of their usual job description.

Sample: Cost data were collected from healthcare providers through routine monitoring data collection and households through the endline survey. In addition, costing data were included in the key informant interviews to better understand the policy environment for future implementation.

Data collection tools: UNICEF's internal Funds Retirement Sheets were used to capture the actual expenditures related to each activity.

Data collection procedures: The SMOH submitted the Funds Retirement Sheets to UNICEF after every IYCF activity conducted. SPRING transcribed information included in Funds Retirement Sheets into a Microsoft Excel spreadsheet. Personnel time was estimated based on the amount of time different UNICEF and SPRING staff members spent implementing IYCF activities applicable to them. The State and LGA were further interviewed to know if there were other independent costs incurred by the State and/or the LGA that were not paid for by UNICEF.

DATA MANAGEMENT AND STATISTICAL ANALYSIS

As in the previous section, here we describe data management procedures and statistical analysis for quantitative survey and assessment data, cost data, and qualitative data.

Quantitative Survey and Assessment Data

Quantitative data were collected through Health Worker Assessments, Community Leader Surveys, Community Volunteer Surveys, and the Maternal Survey.

Data Management

At baseline, all quantitative data were collected using "paper and pencil" and collated in the offices of the NBS. Trained data entry staff of the NBS entered the data using appropriate Foxpro and ODK software. Data entry computers were password protected and kept in a locked room to which only the study coordinator and data entry personnel had access. All paper files were kept in a locked filing cabinet located inside a locked room in the offices of the NBS until the completion of the evaluation. At endline, all data were encrypted and stored on a secure online server provided by SurveyCTO.

Data Analyses

Quantitative analyses were conducted using STATA software, version 12. Descriptive statistics were used to examine demographic characteristics. Additionally, chi-square goodness-of-fit tests and t-tests were used to test whether the observed proportions for categorical variables differed significantly between time points or between locations. Statistical significance was determined where $p<0.05$.

Logistic and linear regressions, controlling for time point, locations, and their interaction, were used to assess the statistical significance of differences in differences (DID). Again, statistical significance was determined if the p value for the interaction terms was less than 0.05.

Finally, DIDs were tested after adjusting for potential confounders that were unequally distributed across the LGA and outside the manageable control of the C-IYCF program. These included child's age, child's sex, mother's age, mother's education, mother's employment status, mother's religion, mother's group membership, mother's number of children, and household's wealth quintile.

Qualitative Data

Data Management

Notes taken during Structured Key Informant Interviews at baseline were either typed and saved as Word files during the interview or recorded using paper-based forms. Notes taken using the paper based form were typed into an Excel spreadsheet created solely for this purpose. At baseline, key informant interviews were not recorded.

Endline qualitative interviews (semi-structured key informant interviews) were tape recorded, transcribed, and subsequently coded by the co-PIs based in the United States, in close partnership with the Nigerian team (see data analysis section below).

Data Analysis

Endline qualitative data were analyzed using Nvivo 11. Qualitative data from open-ended questions were transcribed and coded by two research team members to identify key themes. These themes were then compared and agreed upon among the research team based on their relevance to the overall research questions. The final analysis focused on the convergence or divergence of activities prioritized among various types of institutions, as well as the rationales employed in selecting these priorities and determining the level of financial resources needed. Other themes of interest in data analysis included program governance processes, including how discussions were being carried out and how differences in opinions were reconciled with regard to the priority and budget, both within the key informants' own institution and with their peer institutions.

The Complex Adaptive Systems (CAS) framework for health care guided the analysis of the qualitative key informant interviews. Bradley et al. (2012) propose a sequence of nonlinear, highly iterative steps that are strongly interconnected, and used to assess the landscape, innovate to fit users' needs, develop support, engage user groups, and devolve efforts for spreading innovation.

Specifically, AIDED was used as the conceptual framework guiding the assessment of **Study Objectives 1 & 2** related to the enabling environment and processes involved with the implementation of the C-IYCF program in Nigeria. The qualitative enabling environment data analyses focused on assessing agenda setting, policy formulation and adoption, leadership and partnerships, implementation, and evaluation. In addition, the analysis identified the key positive and negative feedback loops that were in place during program implementation.

Cost Data

Data Management

All data on costs for the 18 months of implementation were collected and collated by the study coordinator during the course of implementation and shared with the study team only. At endline, these data were updated and reported. General cost data (not including salary information) were shared back to implementers for validation of collected information and assuring data completeness.

Data Analysis

Apart from data collected through the Health Worker Assessment, the Community Volunteer Survey, and the Maternal Survey, expenditure data were maintained and analyzed in Microsoft Excel. Relevant costing data results from other data sources (surveys, key informant interviews, etc.) were incorporated into the overall cost data spreadsheet to calculate total costs.

QUALITY ASSURANCE

Quality assurance was an integral part of the study. It included the following broad strategies:

- Recruiting competent and experienced researchers, data collection supervisors, and enumerators
- Extensively training all data collection supervisors and enumerators on administration of all study tools and confidentiality of information obtained
- Developing an interview guide for key informant interviews to ensure that all questions were thoroughly explored with key informants of each category
- Carefully explaining the purpose of the interviews to all categories of key informants, and obtaining oral consent prior to all interviews
- Adopting systematic procedures for data management by strictly keeping all interview notes within the SPRING research team and not sharing these notes with outside individuals
- Developing a report outline and dummy tables for final reporting
- Adequately supervising during the data collection process to ensure fidelity to all study protocols and procedures (including the tablet-based data collection system).

SAFETY CONSIDERATIONS

Ethical Considerations

The evaluation was conducted in accordance with the principles outlined in the United Nations Evaluation Group (UNEG) 'Ethical Guidelines for Evaluation' (2008) and UNICEF evaluation guidelines. The study protocol and tools were approved by the National Health Research Ethics Committee of Nigeria (NHREC) in Abuja Federal Capital Territory (FCT) as well as the Institutional Review Board (IRB) of JSI Research and Training Institute, Inc. (an implementing partner of the SPRING project).

The study objectives, study procedures, and time involved were clearly explained to all study subjects before they were asked to provide their consent to participate. Although this was a very low-risk, non-

invasive study, any possible risks associated with participation in the study were addressed. Possible benefits for respondents and/or their communities derived from their participation in the study were shared as well. Respondents' signatures were collected whenever appropriate as proof that they agreed to participate in the interview. In the case of illiterate respondents, verbal consent was obtained and noted by the interviewer. An additional signature was collected from each of the interviewees if they allowed the interviewers to audio-record the interviews. The data collected were kept confidential and only accessed by the PI, the co-PIs, and two qualitative research analysts. No names of informants or organizations were used anywhere in our reports without the consent or prior approval of the respondents.

Letters of introduction for interviewers to present to interviewees were also sought from the data collecting firm.

Potential Risks

This was a very low-risk, non-invasive study. Potential risks may have included emotional distress as a result of some of the questions and/or worries about a breach of confidentiality. To address these potential risks associated with participation in this study, enumerators explained to respondents all measures taken to ensure the confidentiality of respondents' identities and responses. Respondents were specifically told that they were free to decline to participate or not to answer any questions they did not want to answer without any fear of retribution whatsoever.

Potential Benefits

There were no potential personal benefits to interviewees associated with participation. The overall benefit came from providing information that would help researchers understand the impact of the *C-IYCF Counselling Package* and best practices for its implementation.

DURATION OF THE STUDY

From the time of the first planning meeting in November 2013 until completion of this annex to the final report, four years have passed.

LIMITATIONS OF THE STUDY

This study was not a randomized controlled trial. It followed a quasi-experimental design, meaning that findings would be difficult to interpret if the intervention and comparison LGAs differed in important socioeconomic and demographic characteristics and in terms of health infrastructure. This confounding potential was taken into account when selecting the comparison LGA. In addition, we were able to adjust results statistically for potential socioeconomic status and demographic confounders. However, we were not able to adjust results to address differences between LGAs in the prevalence of polygamous family structures, which can affect women's control of resources, decision-making power, and, ultimately, nutrition practices.

A second limitation related to Key Informant Interviews, Health Worker Assessments, Community Leader Surveys, and Community Volunteer Surveys was the possibility that key informants identified at baseline may have left their positions before the end of project (two years after the baseline). In that instance, we

needed to take into account when interpreting enabling environment findings that some of the information at pre- and post-assessments may have come from different individuals.

Finally, because the study was conducted in only one state, it may be difficult to generalize findings to all of Nigeria.

REFERENCES

Bradley EH, Curry LA, Taylor LA, et al. 2012. "A model for scale up of family health innovations in low income and middle-income settings: a mixed methods study." *BMJ Open* 2012;2:e000987. doi:10.1136/bmjopen-2012-000987.

Moran AC, Kerber K, Pfitzer A, Morrissey CS, Marsh DR, Oot DA, Sitrin D, Guenther T, Gamache N, Lawn JE, Shiffman J. 2012. "Benchmarks to measure readiness to integrate and scale up newborn survival interventions." *Health Policy Plan*. 2012 Jul; 27 Suppl 3:iii29-39.

National Population Commission (NPC) [Nigeria] and ICF International. 2014. *Nigeria Demographic and Health Survey 2013*. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF International.

United Nations Evaluation Group (UNEG). 2008. "Ethical Guidelines for Evaluation." Available at http://www.uneval.org/search/index.jsp?q=ethical+guidelines

White J and J Mason. 2012. *Assessing the impact on child nutrition of the Ethiopia Community---based Nutrition Program: Report to UNICEF of an evaluation study*. New Orleans: LA: Tulane University School of Public Health and Tropical Medicine.

World Health Organization (WHO). 2010. *Indicators for assessing infant and young child feeding practices: Measurement*. Geneva: WHO.

SPRING
JSI Research & Training Institute, Inc.
1616 Fort Myer Drive, 16th Floor
Arlington, VA 22209 USA
Phone: 703-528-7474
Fax: 703-528-7480
Email: info@spring-nutrition.org
Internet: www.spring-nutrition.org
Cover image courtesy of SPRING

This document is made possible by the generous support of the American people through the United States Agency for International Development (USAID) under the terms of the Cooperative Agreement AID-OAA-A-11-00031 (SPRING), managed by JSI Research & Training Institute, Inc. (JSI) with partners Helen Keller International, the Manoff Group, Save the Children, and the International Food Policy Research Institute. The contents are the responsibility of JSI, the United Nations Children's Fund (UNICEF), and the Federal Ministry of Health (FMOH) of Nigeria, and do not necessarily reflect the views of USAID or the United States Government.