Phone-based Reach Up and Learn Cost-Effectiveness Report

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Abstract

The global refugee crisis is one of the defining humanitarian issues of our time. This project aims to address the needs of children in early childhood in humanitarian contexts and during the COVID pandemic through evaluating a "low-cost" approach that can be scaled quickly to serve as many children and families as possible.

Reach Up and Learn (RUL) was adapted by the International Rescue Committee to be delivered in a humanitarian context in Jordan and to be delivered by phone due to the COVID-19 pandemic. The effectiveness component of the evaluation used a cluster-randomized trial where community health volunteers (CHVs) were randomized to deliver either a) health and nutritional content or b) health, nutritional, and added RUL and psychosocial support content. We observed two completed calls per month on average, over a six-month period.

The effectiveness study found that phone-based RUL reduced caregivers' depressive symptoms. The results also indicate that this reduction was mediated by CHVs non-judgmental rapport (Rafla et al., 2022).

This report describes the cost-effectiveness component of the evaluation of Phone-based RUL. We estimated the costs of Phone-based Reach Up and Learn relative to the control condition. Per household, the intervention was estimated to cost $110 on average. This estimate includes the costs to IRC to deliver the program and the costs to caregivers to participate.

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1. Introduction

The global refugee crisis is one of the defining humanitarian issues of our time, with more than 33 million children forcibly displaced due to conflict and war across the Middle East and around the world (UNICEF, 2021). All children need nurturing care, a comforting routine, and opportunities to learn through play in the critical first years of life (Black et al., 2021; Richter et al., 2017), and with exceptional levels of trauma and vulnerability, refugee children are indeed in exceptional need. Yet, only about 3 percent of humanitarian assistance goes to education with a small portion of those funds directed to early childhood development services (Moving Minds Alliance, 2020). This project aims to address the needs of children in early childhood in humanitarian contexts and during the COVID pandemic through "low-cost" approaches that can be scaled quickly to serve as many children and families as possible.

Reach Up and Learn (RUL) is a home-visiting program that was introduced in Jamaica in the 1980s (Powell & Grantham-McGregor, 1989). The program was later adapted to serve Syrian refugees in the Syrian response region and implemented by the International Rescue Committee (IRC) in Jordan. The approach was further adapted to be delivered by phone due to the COVID pandemic. To the best of our knowledge, this is the first audio-only parenting-and-caregiver-intervention program delivered in a humanitarian context. The program served children from 6-42 months of age among Syrian, Jordanian, and other households in Ajloun, Jarash, Mafraq, Amman, Irbid & Ramtha in Jordan. The research sample was from Irbid and Ramtha governorates.

The study was designed for RUL community-health volunteers (CHVs) to call caregivers three times a month for six months to (1) check on the caregivers' well-being; (2) deliver health and nutrition messages; and (3) coach the caregivers to complete child-development activities. In practice, an average of two calls per month were delivered, not three calls per month as intended. The activities were designed to be stimulating for young children and accessible for caregivers to complete with their children. For example, some activities include creative toy play with basic household items such as plastic bottles, bottlecaps, and plastic containers.

RUL was provided via phone and in addition to IRC's health and nutritional content (Vachon & Wilton, 2020). Both treatment and control groups received calls that included health and nutrition messages. The treatment group received what we refer to as "Phone-based RUL", which was additional content on caregiver psycho-social support and RUL's core content on early childhood-development (ECD) activities. The control group received the health and nutrition messages only.

The Global TIES for Children Center at New York University conducted an evaluation of the remote-delivered audio-only version of RUL run in Jordan. The evaluation followed a

randomized design where community-health volunteers (CHVs) and their caseloads of families were randomly assigned to the treatment or control groups. This report presents the cost component of the evaluation. This work complements the report from NYU Global TIES on the effects of the Phone-based RUL intervention (Rafla et al., 2022). In their report, they discuss extant literature regarding child development and home-based parental involvement interventions, such as RUL. They also provide a history of RUL and the development of the intervention for this context, population, and study. In what follows, we focus on the cost-effectiveness component of the evaluation with the intent to build on the NYU report with an economic perspective and research on costs. This report builds on NYU's report by taking an economic perspective with a focus on costs and resources. Our research questions are:

1. What is the cost of Phone-based RUL relative to receiving health- and nutrition-based calls?

2. What costs are borne by the delivering organization and what costs are borne by caregivers?

2. Prior Evaluations of RUL

RUL was originally evaluated as a home-visiting program in Jamaica in the 1980s. Children who were identified as severely malnourished were randomized to either a treatment or control group; the treatment group received visits from trained home visitors for three years, and the control group received no home visits. The home visitors taught caregivers to interact with their young children by providing ideas for stimulating activities conducted with accessible materials. Not only were children found to have higher IQ and fewer behavioral problems in childhood, but the children were followed into adulthood had higher earnings and fewer behavioral problems (Gertler et al., 2014; Walker et al., 2010).

The success of RUL in Jamaica led to replication efforts in several other low-and-middle-income countries (LMICs), as summarized in Table 1. The frequency of reporting cost estimates seems to be growing; of the eleven RUL studies that report cost estimates, ten have been published in the past decade (although none focused on a remote-delivered version; Andrew et al., 2020; Araujo et al., 2021; Attanasio et al., 2014; Attanasio et al., 2022; Brentani et al., 2021; Josephson et al., 2017; Grantham-McGregor et al., 2020; Powell & Grantham-McGregor, 1989; Walker et al., 2019; Wilton et al., 2021; Zhou et al., 2022b). However, there seems to be a lack of consistent methodology in calculating cost estimates. Among the studies that calculated costs related to RUL, they seldom reported costs in a disaggregated form with comprehensive descriptions of the resources included in the cost estimates. The studies that report cost estimates for RUL exclude the cost of parents' or caregivers' time to participate in the program. Rather, they are limited to the direct costs, such as salaries of staff members, supplies, training, and

materials associated with implementing the program. Direct costs are components of economic evaluation but are not considered comprehensive as they do not incorporate aspects of economic evaluation such as opportunity cost. In these reports (conducted in Brazil, China, Colombia, India, Jamaica, Jordan, Lebanon, and Peru), costs per child varied, ranging from $8 to $752 ($9 to $860 in 2021 USD). The lack of consistent cost methodology makes it difficult to compare across RUL studies or between RUL and other early childhood interventions.

As RUL has continued to be adapted in different contexts, so has the method of delivery. Evidence from India demonstrated that costs were reduced by over 70 percent, without affecting average impacts, when the program was delivered in group sessions rather than individual home visits (Grantham-McGregor et al., 2020). The variety of RUL adaptations in different settings highlights how resource requirements may be context dependent. For example, group delivery can only occur in settings where group sessions are culturally appropriate.

A recent impact evaluation of China REACH, a replication of RUL in China, included cost estimates for both China REACH and the original Jamaica Home Visiting program (Zhou et al., 2022a; Zhou et al., 2022b). China REACH lasted 22-months and was delivered in rural provinces in China. The authors used program data from the China REACH and historical expenditure documents from the Jamaica Home Visiting program. They found that China REACH cost $500 per child per year in 2015 USD ($570 in 2021 USD) and the Jamaica Home Visiting program cost $750 per child per year (Zhou et al., 2022b).

In estimating these costs, the authors outlined the cost categories (personnel, materials, and facilities) as well as stating which costs were fixed and which were variable. However, the level of detail in the study makes it difficult to determine which resources were included; for example, the authors include personnel as a cost but do not provide information on roles or responsibilities of the personnel, or whether the opportunity cost of parental time was included. Additionally, it is not clear whether the costs outlined in the study are incremental costs relative to the control group.

For parenting-intervention programs, valuing parents or caregivers' time is critical in understanding the true costs of the programs to produce the program effects. We conduct a cost-effectiveness analysis using the ingredients method and account for the opportunity costs of caregivers' time in participating in the program.

Table 1. Prior RUL Studies

Country	Authors	Year	Program Delivery	Program Setting	Includes Economic Evaluation	Type of Economic Evaluation	General Cost Findings	Uses ingredients method
Bangladesh	Hamadani et al.	2006	Individual, Group	Home, Community	N	N/A	N/A	N/A
	Nahar et al.	2012a	Individual, Group	Clinic	N	N/A	N/A	N/A
	Nahar et al.	2012b	Individual, Group	Clinic	N	N/A	N/A	N/A
	Tofail et al.	2013	Individual	Home	N	N/A	N/A	N/A
	Nahar et al.	2014	Individual, Group	Clinic	N	N/A	N/A	N/A
	Grantham-McGregor & Smith	2016	Individual	Home	N	N/A	N/A	N/A
	Hamadani et al.	2019	Group	Clinic	N	N/A	N/A	N/A
	Mehrin et al.	2021	Individual, Group	Clinic	N	N/A	N/A	N/A
	Pitchik et al.	2021	Group, Group--individual combined	Home, Community	N	N/A	N/A	N/A
	Mehrin et al.	2022	Group	Clinic	N	N/A	N/A	N/A
Brazil	Smith et al.	2018	Individual	Home	N	N/A	N/A	N/A
	Brentani et al.	2021	Individual	Home	Y	CEA framework	$393/child per year when delivered by child development agents, $241/child per year when delivered by CHVs.	N
China	Sylvia et al.	2022	Individual, Center	Home, Community	N	N/A	N/A	N/A
	Zhou et al.	2022a	Individual	Home	N	N/A	N/A	N/A
	Zhou et al.	2022b	Individual	Home	Y	CEA framework; Compared China REACH	$528/child in 2015 USD; JHV was $752/child in 2015 USD	N

Country	Authors	Year	Program Delivery	Program Setting	Includes Economic Evaluation	Type of Economic Evaluation	General Cost Findings	Uses ingredients method
						cost per child with JHV cost per child		
	Attanasio et al.	2014	Individual	Home	Y	In-text cost estimate	$500/child per year	N
	Grantham-McGregor & Smith	2016	Individual	Home	N	N/A	N/A	N/A
Colombia	Andrew et al.	2018	Individual	Home	N	N/A	N/A	N/A
	Attanasio et al.	2022	Individual	Home	Y	CEA framework	$322/child; compares it to other ECD programs in Colombia	N
	Andrew et al.	2020	Individual	Home	Y	Cost Analysis	$251/child at 18 months; $168/child per year at 12 months in 2014 USD	N
India	Grantham-McGregor et al.	2020	Individual, Group	Home, Community	Y	CEA framework	Group sessions cost $38/child per year; home visiting cost $135/child per year, implying an increase by a factor of 3.5 in returns to investment with group sessions.	N
	Powell & Grantham-McGregor	1989	Individual	Home	Y	In-text cost estimate	$172/child per year	N
Jamaica, Antigua, St. Lucia	Grantham-McGregor et al.	1991	Individual	Home	N	N/A	N/A	N/A
	Grantham-McGregor et al.	1994	Individual	Home	N	N/A	N/A	N/A

Country	Authors	Year	Program Delivery	Program Setting	Includes Economic Evaluation	Type of Economic Evaluation	General Cost Findings	Uses ingredients method
	Grantham-McGregor et al.	1997	Individual	Home	N	N/A	N/A	N/A
	Walker et al.	2000	Individual	Home	N	N/A	N/A	N/A
	Powell et al.	2004	Individual	Home	N	N/A	N/A	N/A
	Walker et al.	2004	Individual	Home	N	N/A	N/A	N/A
	Baker-Henningham et al.	2005	Individual	Home	N	N/A	N/A	N/A
	Gardner et al.	2005	Individual	Home	N	N/A	N/A	N/A
	Walker et al.	2005	Individual	Home	N	N/A	N/A	N/A
	Walker et al.	2010	Individual	Home	N	N/A	N/A	N/A
	Walker et al.	2011	Individual	Home	N	N/A	N/A	N/A
	Gertler et al.	2014	Individual	Home	Y	BCA framework	Intervention increased earnings by 25% 20 years later	N
	Chang et al.	2015	Individual, Group	Clinic	N	N/A	N/A	N/A
	Grantham-McGregor & Smith	2016	Individual	Home	N	N/A	N/A	N/A
	Walker et al.	2018	Individual	Home	N	N/A	N/A	N/A
	Walker et al.	2019	Individual, Group	Home, Clinic	Y	BCA	Cost of one year of home visit intervention is US$245.10/child. The Benefit-Cost ratio is 3.8. Authors outline assumptions.	N
	Gertler et al.	2021	Individual	Home	N	BCA framework	Intervention increased earnings by 37% 30 years later	N
	Walker et al.	2022	Individual	Home	N	N/A	N/A	N/A

Country	Authors	Year	Program Delivery	Program Setting	Includes Economic Evaluation	Type of Economic Evaluation	General Cost Findings	Uses ingredients method
Jordan, Lebanon, and northeastern Syria	Wilton et al.	2021	Individual	Home	Y	Cost Analysis	Three models: education, child protection, and health. Costs ranged from US$8-US$56 (2019 dollars) per home visit. Cost differences driven by scale.	N
Peru	Grantham-McGregor & Smith	2016	Individual	Home	N	N/A	N/A	N/A
	Josephson et al.	2017	Individual and Group	Home, Community	Y	Cost Analysis	$480/ family in 2016 USD	Y
	Araujo et al.	2021	Individual	Home	Y	BCA	Benefit-cost ratio is 5.4 in Peru and 4.6 in Colombia. Authors outline assumptions.	N
Madagascar	Galasso et al.	2019	Individual	Home	N	N/A	N/A	N/A
Zimbabwe	Smith et al.	2018	Individual	Home	N	N/A	N/A	N/A

Note–this table reports cost estimates for evaluation studies of Reach Up and Learn (RUL) and adaptations of RUL. A study that refers to its economic evaluation as a "CEA framework" makes reference to comparing its total costs with a standardized effect measure but does not provide a cost-effectiveness ratio (e.g., Zhou et al., 2022b). Similarly, a study that uses a "BCA framework" makes reference to long-term economic and public benefits of a program but does not conduct a standard benefit-cost analysis (e.g., Gertler et al., 2014). A study that provides an "in-text cost estimate" provides a basic currency amount (usually in US dollars) of the program cost in the body of the manuscript but provides little or no information on how the authors calculated the cost estimate. RUL= Reach Up and Learn; JHV= Jamaica Home Visiting Program. CEA= Cost-Effectiveness Analysis; BCA=Benefit-Cost Analysis. This table was informed by Jeong et al. (2021), which provides a similar table of parenting interventions with cognitive stimulation components including interventions not adapted from RUL.

3. Phone-based RUL in Jordan

Since the start of the Syrian war in 2011, more than half of the Syrian population has been forcibly displaced, with over 6.8 million refugees in Jordan, Lebanon, Turkey, and other neighboring countries (Karasapan, 2021). As of December 2020, official reports suggest that Jordan has hosted more than 672,000 registered Syrian refugees, although the actual total is estimated to be around 1.3 million when considering those not officially registered as refugees (3RP, 2020). According to the Jordan Labor Market Panel Survey (JLMPS) of 2016, almost half

of the Syrian refugees were under the age of 15 and men aged 20-34 were more underrepresented than women, where Syrian refugees with siblings were more likely to have lost a brother than a sister, potentially due to differential sex-specific mortality rates from war (Krafft et al., 2018).

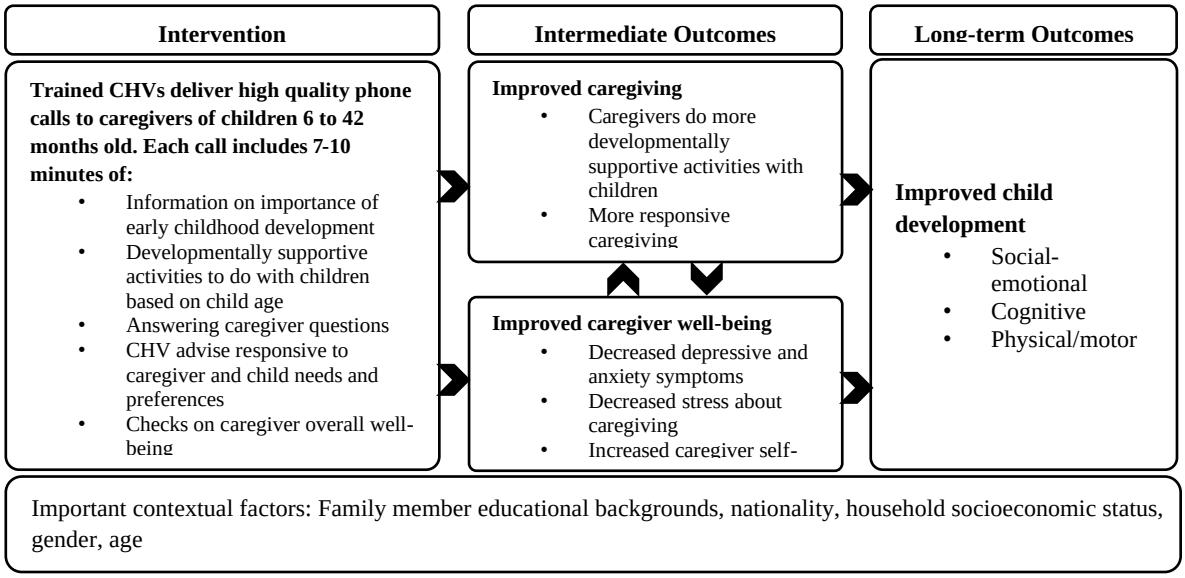
The pandemic has worsened already-difficult living situations for Syrian refugees. It is reported that around 80 percent of Jordan's Syrian refugees live in poverty and families struggle to cover basic needs such as rent, food, heating, and healthcare (3RP, 2022). In addition, many Syrians are heavily indebted to cover basic needs and rely mainly on humanitarian assistance (IRC, 2020).

In 2016, the IRC began delivering RUL to Syrian refugee families in Jordan, Syria, and Lebanon. The program was delivered in homes to caregivers of children aged 6-42 months receiving weekly or bi-weekly home visits over a 3-month or 1-year period. IRC and NYU's Global TIES for Children intended to launch an evaluation of the in-home RUL program in Jordan in early 2020, but this was not possible due to COVID-19. The IRC adapted the home-based program to be delivered via phone once the COVID-19 pandemic made it impossible to serve families in person. The program duration was adjusted to be delivered over 6 months with three calls per caregiver per month, for a total of 18 calls offered to each caregiver, and other programmatic adaptations made to account for the delivery mode. IRC added a caregiver well-being component, where the community-health volunteers (CHVs) were prompted to ask caregivers about their psychosocial well-being.

The adaptation of RUL for phone-based audio-only was designed as a parenting-intervention delivered by CHVs, who are considered "trusted messengers". The CHVs share information with caregivers about the importance of child development and provides specific strategies for stimulating play activities for young children. The goal is to strengthen early childhood development so that young children achieve cognitive and socioemotional learning skills for future academic success and well-being. Figure 1 provides an overview of these components and the theory of change.

In this study, we examine the costs of delivering Phone-based RUL as a component of the larger evaluation of the program's effects conducted by NYU Global TIES. In the following section we summarize the effectiveness findings.

Figure 1. Components of Phone-based RUL and hypothesized outcomes



Note–information on the Phone-based RUL components and theory of change was provided to CBCSE from NYU Global TIES. This theory of change is summarized in Walker et al. (2018).

4. Effectiveness of Phone-Based RUL

The evaluation of Phone-based RUL was designed to support investigating causal questions of the program's effects primarily on caregiving practices as well as various aspects of caregiver mental health and well-being, as well as on early childhood development as an exploratory outcome. The evaluation also included complementary research to understand the implementation and costs of Phone-based RUL in this context. The evaluation was conducted via a cluster-randomized trial in which CHVs were randomly assigned to deliver a) health and nutrition content or b) health, nutrition, and added RUL and psychosocial support content. Because CHVs were randomized, entire caseloads of families were randomized to the treatment or control conditions. In this section, we provide a brief overview of the effectiveness study (Rafla et al., 2022) to provide the context for the cost study.

The effectiveness study is guided by five primary research questions:

1) What is the impact of six months of the audio-only, phone-based adaptation of Reach up and Learn program plus health and nutritional messages on caregiver-reported responsive parenting, harsh disciplinary practices, parent-child activities, parental well-being, and parenting self-efficacy, relative to audio-only, phone-based health and nutritional support only?

2) What is the impact of the program on caregiver-reported child-developmental milestones and social-emotional behaviors?

3) What is the impact of the program on parental co-viewing with their children of the Ahlan Simsim TV program (part of the Ahlan Simsim initiative that also included the current program)?

4) What is the impact of the program on implementation factors (recorded phone call quality; caregiver-reported receipt of messages related to health, nutrition, and parent-child activities; caregiver-reported engagement in the activities specifically suggested by callers)? Do impacts on implementation factors explain (mediate) any impacts on the primary outcomes?

5) Are effects of the program on hypothesized outcomes moderated by household nationality, child gender, or child age?

The impact evaluation found that the intervention had no detected impacts on many outcome measures, including parenting measures (e.g., parenting stress, parenting self-efficacy, parent-child learning activities, caregiver responsiveness, and positive child discipline), and child developmental and behavioral outcomes. The intervention was found to reduce caregiver depressive symptoms by 0.11 of a standard deviation, although it had no detectable impact on caregiver anxiety. Caregivers in the treatment group also reported watching *Ahlan Simsim* more with their children.

A random sample of call recordings (n = 311 calls) were screened and assessed by NYU-trained coders for call quality on indicators of responsiveness and non-judgmental rapport. CHVs on Phone-based RUL calls were rated as substantially more responsive and more likely to show non-judgmental rapport on the phone. In addition, higher scores on the non-judgmental rapport scale predicted lower caregiver depressive symptoms and mediated the relationship between treatment and depressive symptoms (Rafla et al., 2022). Lastly, the authors explored whether treatment impacts varied by household nationality, child gender, child age, baseline social support, and found no robust evidence of treatment heterogeneity.

5. Methods

The primary goal of this evaluation is to examine the effects, implementation, and costs of Phone-based RUL. The cost component of the evaluation is designed to causally identify the resources delivered through Phone-based RUL relative to the resources delivered to the control condition in a cost-effectiveness evaluation. Thus, this work aims to estimate the costs to

produce effects. The driving goal behind cost-effectiveness evaluations is to estimate effects and corresponding costs that can be compared to inform policy decisions.

Importantly, cost-effectiveness is focused only on the costs related to effects, which does not include the costs to conduct the evaluation. Similarly, the intervention is examined as it is delivered and the costs to develop the intervention are not included. The reasoning for this is that cost-effectiveness is meant to inform decisions to deliver or improve Phone-based RUL and the sunk costs to develop Phone-based RUL are not relevant.

More specifically, this work addresses the following research questions:

1. What is the incremental cost of Phone-based RUL relative to receiving health- and nutrition-based calls?

2. What costs are borne by the delivering organization and what costs are borne by caregivers?

The cost analysis was conducted using the ingredients method (Levin et al., 2018). The ingredients method was developed based on the economic principle of opportunity costs to reflect the value of all resources provided toward achieving an effect, including parental and caregiver time or other donated resources. The ingredients method also follows cost-accounting procedures to support replication and program improvement by describing the resources ("ingredients") used so that the qualities, quantities, and prices are identified separately. This method is widely recognized as a rigorous approach to estimating costs, and the method meets standards of quality for economic evaluation (Cost Analysis Standards Project, 2021).

The costs estimated here reflect the total cost of the addition of Phone-based RUL to existing health and nutrition calls. Both the control and the treatment groups received messages focused on health and nutritional content, and the treatment group received additional content including content from the RUL curriculum related to ECD and caregiver well-being check-ins. By estimating the treatment costs that are incremental to the control group, this cost analysis is designed to uncover the costs related to the production of the program's documented impact in the evaluation. The resources necessary to provide services to the control group are therefore not included in the cost analysis.

In this study, ingredients, or resources, include all the inputs for Phone-based RUL related to personnel, materials, training, facilities, and other inputs. Below, we describe the methods used to collect ingredients data that describes and quantifies the resources used, to price the value of ingredients, to estimate costs, and to calculate the costs-effectiveness ratio.

This evaluation is a collaborative effort with teams from IRC and NYU in addition to the team at the Center for Benefit-Cost Studies in Education (CBCSE) at the University of Pennsylvania. IRC adapted Phone-based RUL and delivered and monitored the implementation of the intervention. As a major service provider and evaluator of interventions to support refugee children, IRC monitors resources and costs related to their programming. While the costs borne by IRC often reflect most of the resources delivered to children and families (costs from "the provider perspective"), in a cost-effectiveness evaluation it is important to also consider other, external sources of inputs or ingredients to successfully deliver services with the aim of improving outcomes. The reasoning for this is to support a complete analysis of the resources used, as well as any variation in those resources, to better understand effectiveness and to improve information for improvement and replication. Thus, the costs to deliver Phone-based RUL borne by IRC are reported below and supplemented with monetization of estimated caregiver time to participate in the intervention and deliver the services to children.

Ingredients Data Collection

Ingredients to deliver Phone-based RUL were initially identified by IRC. The list of ingredients to track was based on program planning and budget documents. IRC maintained records on the ingredients used from the intervention's inception through implementation. Data on how resources were used across program activities were collected through bi-monthly calls with the Jordan-based IRC program delivery team monthly throughout implementation. These ingredients fell into several categories, including IRC staff, non-staff personnel (CHVs, CHV supervisors, monitoring and research assistant), travel, training, facilities, materials, and IRC operational support costs associated with the Phone-based RUL program.

In addition to the costs to deliver the program, we consider caregivers' time as a key ingredient in the Phone-based RUL program. Caregivers were expected to spend time participating in the RUL portion of the CHV phone calls and then to engage in the RUL activities described on the call with their children.

We designed a survey for all families in the treatment and control groups to observe changes in time uses due to RUL-specific activities. The survey included questions about time spent receiving phone calls and asked about the content of the calls (RUL relative to health and nutrition content). We also asked caregivers to report time spent on various child-development activities through the frequency and duration of time spent on educational activities, such as reading, playing games, or singing songs, which were encouraged by CHVs in the Phone-based RUL condition. We administered caregiver surveys at baseline and endline. The caregiver survey is available in Appendix A.

Participant data were also collected by NYU and IRC on household participation and attrition in the treatment and control groups.

Estimating Price Values of Ingredients

As described above, RUL was delivered by IRC and examined following their internal research and monitoring processes. IRC's cost data reflect actual prices (expenditures) incurred by the organization based on the local markets in the implementation context at the time of program delivery. As a U.S. based organization, IRC expenditures are tracked and reported here in US Dollars. Where program resources were purchased in Jordanian dinars, they have already been exchanged into USD using an exchange rate of 1.41 USD for every 1 JOD.

As described above, the Phone-based RUL program relies on caregivers' time to deliver the ECD component of the program. To estimate the costs of their time, we must consider the context for the population served. 55% of the caregivers were Syrian refugees and 45% were Jordanian people. First, we consider the context for the Syrian caregivers.

Employment opportunities for Syrian refugees in Jordan are limited. Starting in 2016, Syrian refugees were able to acquire work permits with the support of sponsors in certain sectors, such as agriculture, construction, and manufacturing (Krafft et al., 2018). Most of this work was informal, irregular wage work, which provided very little economic security and stability. Employment opportunities worsened with the pandemic, where almost 60 percent of Syrians reported that they lost their work and their entire income (3RP, 2022). Despite having a significant proportion of female-headed households, only 5 percent of work permits went to women (IRC, 2020). A lack of transportation, culturally appropriate employment opportunities, and concerns for childcare arrangements were barriers for Syrian refugee women from applying for work permits. When Syrian caregivers can work, we assume that they would be paid the average wage rate of 230 Jordanian Dinars (about $ 324 US dollars), which is a monthly minimum wage for foreign workers in Jordan (Krafft & Hannafi, 2022).

For the Jordanian caregivers, we apply a similar wage rate of 260 Jordanian Diners (about $367 US dollars), which is the reported monthly minimum wage in 2021 (Krafft & Hannafi, 2022).

We also estimate the value of caregiver time using the CHV rate. This sensitivity test is important because the minimum wage rates may not capture the true opportunity costs for caregivers to participate in Phone-based RUL. We describe our process for pricing caregiver time in further detail in sections 6 and 9 below.

IRC materials for program implementation included cell phones and tablets for CHVs. Computer monitors and tablets were also purchased for activities outside of direct program implementation, included under capital expenses.

Limitations

We report our cost estimates in US dollars following guidelines from the USAID (Walls et al., 2020). This allows us to compare across programs and contexts with a standardized metric for costs, which is a necessary component to interpret cost-effectiveness ratios and inform greater learning about how to best serve children in humanitarian and global contexts. There are also limitations in using US dollars based on market exchange rates between the Jordanian dinar and the US dollar, which does not consider the purchasing power of the Jordanian dinar. USAID recommends against using the purchasing-power-parity (PPP) exchange rates given that a PPP-adjusted cost would likely overstate the actual delivery cost. This is because a PPP-adjusted cost estimate would represent the costs as if Phone-based RUL was delivered in the U.S. For example, if RUL was delivered in the U.S., salaries for equivalent personnel would be far higher than they are in Jordan, and thus the total cost of the program would be much higher. It would be misleading to represent Phone-based RUL costs in U.S. dollars because the program would appear to cost far more than in the actual delivery context (Walls et al., 2020).

6. Observed Phone-Based RUL Ingredients

Phone-based RUL was delivered in each CHV phone call along with health and nutrition content. The intervention was designed to be delivered via three 25-to-30-minute phone calls per month. Those calls were intended to include about seven to ten minutes on the RUL content. During implementation, CHVs completed about two phone calls per household per month (1,157 households with 13,185 total completed phone calls over six months). Phone calls were observed to be about 28 minutes on average with eight and a half minutes devoted to the RUL content. Table 2 below demonstrates implementation and how the resources varied from the design of the program.

Given that the RUL content was delivered alongside health and nutrition content, we outline all ingredients allocated through both components of the phone-based home visiting program provided to the households in the treatment group. Appendix B lists the ingredients that were allocated in total with descriptions of each resource. This information goes beyond the ingredients used to estimate the cost of Phone-based RUL because the control condition also received CHV phone calls with the health and nutrition content. We provide this information to allow readers to observe the resources involved in the phone-based home visiting intervention in total, as all the resources would be relevant to replicate what the treatment households received.

Table 2. Program delivery, as-designed versus as-delivered

	Control		Treatment	
	As designed	*As delivered*	*As designed*	*As delivered*
Duration	6 months	6 months	6 months	6 months
Calls per month	3 calls	2 calls	3 calls	2 calls
Total calls over program duration	18 calls	13.2 calls	18 calls	11.4 calls
Minutes spent on RUL messages	N/A	N/A	7-10 minutes	8.5 minutes
Minutes spent on health and nutrition messages	10-15 minutes	16.5 minutes	10-15 minutes	16.5 minutes
Minutes spent on greetings and call summary	8 minutes	2.6 minutes	8 minutes	4 minutes
Total call length in minutes	18-23 minutes	20.6 minutes	32-43 minutes	26 minutes

Note—as delivered estimates are averages gathered from a random subsample of 311 recorded calls.

For the cost-effectiveness study, the cost estimate includes just the ingredients that were provided to the treatment households that were not provided to the control households. In other words, the costs relative to (or incremental to) the control. To illustrate this, the ingredients of the treatment and control conditions are listed below in Table 3. Descriptions for all ingredients (personnel, training for CHVs, facilities, and materials) are available in the appendix. Given the importance of caregivers and CHVs, we provide additional details on each below.

Table 3. Ingredients of Phone-based RUL including health and nutrition messages across study arms.

Treatment Ingredients	Control Ingredients
Personnel	***Personnel***
Caregiver time spent on health & nutrition messages and RUL messages	Caregiver time spent on health & nutrition messages
Contractual Staff (No benefits)	***Contractual Staff (No benefits)***
Community Health Volunteer (CHV)	Community Health Volunteer (CHV)
Supervisors	Supervisors
National Staff (Full benefits)	***National Staff (Full benefits)***
Personnel listed in Appendix B	Personnel listed in Appendix B
Training	***Training***
CHV training on health & nutrition messages	CHV training for health & nutrition messages
CHV training on RUL messages	
Facilities	***Facilities***
IRC office in Mafraq	IRC office in Mafraq
Materials	***Materials***
Phones (Caregivers)	Phones (Caregivers)
Tablet with SIM card (CHVs)	Tablet with SIM card (CHVs)
Activity materials	
Other	***Other***
Capital Assets	Capital Assets

Note—This table reflects the total ingredients for the treatment and control groups. For descriptions of the ingredients please see the ingredients table in the appendix.

Caregivers

In the treatment group, caregivers received phone calls from CHVs on RUL content and were encouraged to engage in RUL activities with their child. RUL activities include age-appropriate developmental activities that caregivers can engage with their children using basic household items such as plastic bottles, bottle caps, cups, etc. In addition, CHV treatment calls included a question asking about the caregiver's well-being and there was a focus on building positive and collaborative relationships through being attentive to caregivers' ideas and questions.

Phone-based RUL was designed for the CHV to deliver 3 calls per month for 6 months for a total of 18 calls. In practice, we observed CHVs providing about 2 calls per month on average over the course of the intervention. During these calls, 7-10 minutes was allocated for RUL topics on early child development and 3 minutes for well-being check-in.

Community-Health Volunteers (CHVs)

Community-health volunteers were the program delivery vehicle. CHVs were responsible for recruiting families from their own communities to participate in the program. Recall that both treatment arms received calls from CHVs; the treatment-group CHV's provided health and nutrition messages plus RUL content on early childhood development, while the control-group CHV's provided health and nutrition messages only. CHVs were instructed to call families three times a month to (1) check on caregiver well-being, (2) deliver health messages, and, for the treatment-group only, to (3) inform caregivers on stimulating activities. CHVs completed a five-day online training; CHVs in the treatment group received an additional five days of training on the RUL content. This additional RUL training included educating CHVs on the content of the calls, on building rapport with families over the phone, and on tablet and mobile device use. CHVs were of Syrian and Jordanian backgrounds and were responsible for recruiting families from their own communities to participate in the program.

CHVs held an average caseload of 31 families. When families dropped out of the program, CHVs would recruit new families, although only families enrolled during the baseline (November 2020 to February 2021) were included in the effectiveness analysis.

7. Exploring Treatment Contrast, RUL Implementation, and Caregivers' Time

As described above, Phone-based RUL was designed to provide content on early childhood development to caregivers with the goal of changing parenting practices and interactions with children. In the in-person RUL model, the trained RUL staff would demonstrate how to engage in early childhood development activities directly with the caregivers and their children, ask the caregivers to try activities during the visits, give them feedback on their interactions with

children, and encourage caregivers to continue doing activities with children between home visits. In the phone-based model, however, the CHVs would only relay the information to caregivers, and it is the caregivers' role to do these activities with their children, without demonstration from the CHV. Given that the phone-based model required caregivers to spend time on phone calls with CHVs and in doing activities with children between phone calls, in the caregiver survey we expected to see a strong contrast between families in the treatment and control conditions in length of time devoted to CHV calls and in time caregivers spent doing RUL activities.

Our analysis captures caregivers' time as time spent on receiving phone calls and time spent doing early childhood development activities with children outside of the phone calls. IRC examined recorded calls and estimated that 8 ½ minutes were devoted to the RUL content. Thus, we include this time to reflect the average amount of time caregivers spent on the phone relative to what they would have received in the absence of the RUL content. Table 4. shows the time allocation of the call sections between the treatment and control groups.

Table 4. Time allocation during phone calls

Call Section	Control – average duration	Treatment – average duration
Consent	12 seconds	13 seconds
Greeting	56 seconds	1 minute
Health messages	16.5 minutes	16.5 minutes
WHO messages	N/A	N/A
RUL messages	N/A	8 minutes 30 seconds
Closing	56 seconds	51 seconds
Other	34 seconds	1 minute 40 seconds
Total	19 minutes 8 seconds	28 minutes 44 seconds

Note—this table reports the time allocations of the treatment and control phone calls. The time allocations are taken from a random sample of 311 calls that were recorded and analyzed. See Rafla et al. (2020) for a detailed description of this procedure.

The endline caregiver survey results showed no differences in time spent doing early childhood development activities with children between the treatment and control families. More specifically, in response to a question asking whether CHVs encouraged caregivers to do educational activities with their children, nearly all respondents in both treatment and control groups responded yes (T: 97.7%, C: 96.7%). In addition, both groups reported similar time spent doing educational or play tasks with their children (T: 33 minutes/day, C: 36 minutes/day).

There are several possible reasons why caregivers would respond similarly across treatment conditions. One option is that the control group received similar messaging, making the contrast between conditions very minimal. However, this potential reason does not reflect the random assignment design where CHVs were assigned to provide RUL content or not to provide RUL

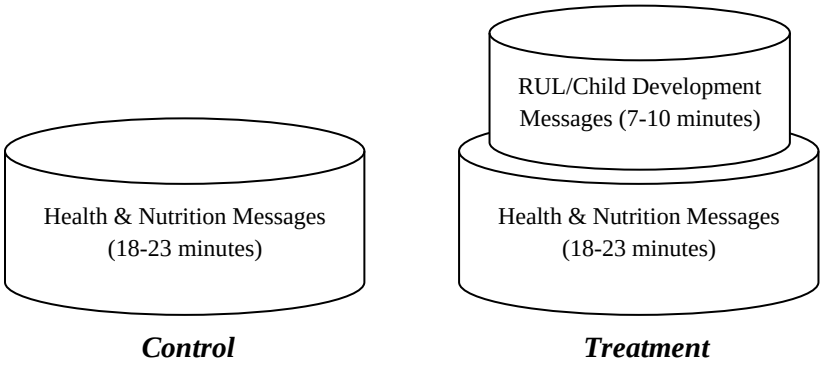
content. A second option could be other messaging that was provided to families in response to COVID quarantine requirements. Service organizations were also asked to deliver World Health Organization (WHO) messages with suggestions to keep children engaged during quarantine. Families could have remembered the WHO messages that preceded the RCT baseline in their survey responses. Third, participant memory could also be a challenge because the endline survey was delivered two to four months after the intervention ended in September 2021.

To explore these reasons, IRC examined call recordings and coded the content provided through 1) the treatment condition with RUL content and health and nutrition content, 2) the control condition with only health and nutrition content, and 3) WHO messages throughout both. IRC coded 130 CHV phone call recordings using a structured observation tool to record time spent on early childhood development and health/nutrition, and whether early childhood development was mentioned in any of the control calls or in treatment calls outside of the RUL content. The calls were randomly selected with 65 treatment calls and 65 control calls from the total sample of 311 recorded calls. Random selection was stratified to reflect variation among CHV calls.

IRC found that the intervention was delivered as intended, with the control group only receiving health content and the treatment group receiving health and RUL content, as planned. In 2 of the 65 control calls coded in the content analysis, the CHVs and caregivers did discuss caregivers playing or doing educational activities with their children. In these two calls, it seemed that these topics came up when CHVs discussed immunization or nutrition for children. CHVs framed these health topics as part of children's overall growth and development and mentioned that caregivers could also play or do activities with children to support their development. This was a small percentage of calls and showed no indication of contamination. Rather, it seems likely that the respondents from the control group may not have understood or inaccurately responded to the endline survey question due to confusion or recall bias.

Given the finding that caregiver time spent on early childhood development activities was not different across treatment and control groups, the estimated cost to caregivers includes only time for the RUL component of the phone calls (8.5 minutes). Because the call length varied, as well as the time spent on RUL messaging, we also test the sensitivity of the results if the RUL content was slightly longer or shorter and find no difference in the results. Figure 2 below illustrates the observed contrast in resources between households in the treatment and control groups. The contrast is additive to other aspects of the intervention and can be classified as a supplemental service program (Bowden, 2022).

Figure 2. Treatment contrast between treatment and control groups



In the results section below, we include a sensitivity analysis to explore how the costs borne by caregivers may change if caregivers respond to the treatment by increasing early childhood development activities in the home in future implementations. Jordan has the highest rate of children engaged in childhood development activities in the region (El-Kogali & Krafft, 2015). To test this assumption, we use the reported time treatment caregivers spent (33.3 minutes per day) on early childhood development activities as proxy for how RUL could change caregiver time in the future.

8. Provider Perspective Cost Estimation and Results

Methods

Following the ingredients method, IRC measured costs concurrently with implementation and the impact evaluation. Usage of all direct program resources that were used in the delivery of Phone-based RUL was tracked across four activities on a bi-monthly basis by the IRC program delivery team, to accurate capture how resources were used. The costs of these resources were allocated to the following activities:

- **Operations Support and Management:** All fixed country- and regional-level costs, such as office rentals, HR, procurement staff, etc.
- **Remote Reach Up & Learn:** All time and effort on coordination, implementation, training, etc. on Phone-based RUL.
- **Shared Health costs:** Time and effort for resources that were shared between ECD and Health teams, such as CHV stipends. Note that allocating time to health and nutrition calls was to remove the health and nutrition content call costs from the RUL costs, not to calculate the discrete cost of the health and nutrition calls.
- **Research and all other programming:** All costs that were included to run a research program and all time and effort on programs that were not Phone-based RUL or health and nutrition content calls. Research costs are not included in the cost results.

Total IRC Spending

From March to September 2021, IRC allocated resources worth $126,110 to deliver Phone-based RUL during the 6-month implementation period (Table 5) IRC costs were divided among direct program costs (70%) and operations support (30%). This is standard for IRC programming, which averages ¼ - ⅓ of total project spending on operational support costs. Operational support costs include all resources required to support program implementation, such as country leadership, finance teams, and office rent and supplies.

The largest cost expense was CHV time to conduct the RUL calls. CHV supervisors were also a large driver of non-staff personnel. CHV time amounted to about 26% of total IRC costs, which is to be expected for a remotely delivered program. In addition, because of a low oversight and remote delivery, there was a lean program management structure and limited material resources used in comparison to traditional in-person educational programs. CHVs are incentive workers and are not considered non-staff personnel. The only benefits CHVs receive is life insurance. If this role was played by salaried staff who received full benefits, we would expect to see total program costs rise significantly.

As a phone-based program, the cost of supplies and materials were quite low in comparison to other educational programs. Caregivers were encouraged to use resources already in their homes to facilitate child development. National-program-staff structures were also light; however, it is important to note that the RUL program leveraged existing health infrastructure and staff. The light country-level management team may change if the program was shifted to in-person or was no longer added onto existing health programming.

Table 5. Detailed Costs to IRC: Operation Support & Direct Program Costs

Cost Type	Operation Support	Program	TOTAL
National Staff	$19,770	$48,240	$68,010
International Staff	$1,990	-	$1,990
Non-Staff Personnel & Contractual	$100	$35,070	$35,170
Capital Assets	-	$1,160	$1,160
Travel & Transportation	-	-	-
Office Rent & Expenses	$3,670	-	$3,680
Supplies & Materials		$3,490	$3,490
Overhead	$12,610		$12,610
TOTAL	**$38,150**	**$87,960**	**$126,110**

Note: Costs reflected in 2021 constant US Dollars, rounded to the nearest ten. Estimates reflect IRC costs to deliver the program.

IRC Average Cost Results

The average cost per household was $110, including IRC's operational-support costs. The cost per RUL phone call per household was $10 on average. These costs are reflected below in Table 5. It is important to note that the cost *per call* is highly dependent on the cost of CHV time and the number of calls CHVs can make to households per month. In future iterations of Phone-based RUL, if CHVs can make more calls per day each month to the same households, then the cost per call would decrease. Similarly, if CHVs can make more calls to more households in the same period, the cost per household would decrease.

Table 6. IRC Costs to Deliver Phone-Based RUL

Number of CHVs	55	
Number of Households	1,157	
Number of Months of HH Calls	6	
Total Household Calls on ECD	13,185	
Cost Drivers	CHV stipends, support/ICR, national staff	
	Total (w/ Mngmt & Op. Sppt)	Program Costs
Cost per Household	**$110**	**$80**
Cost per Call	**$10**	**$10**

Note: Costs reflected in 2021 constant US Dollars, rounded to the nearest ten. Estimates reflect IRC costs to deliver the program. ICR = Indirect cost recovery.

9. Costs and Effectiveness of Phone-Based RUL

Our goal is to estimate the costs of Phone-based RUL corresponding to all the inputs that were used to serve families and to produce effects. Thus, we build on the costs borne by IRC described in Section 8 above to also include the time caregivers spent on the calls with CHVs and implementing the ECD content discussed. The value of caregivers' time in this context is not straightforward. Thus, we considered two options: i) opportunity cost to caregivers, proxied by foregone wages and ii) CHV rates.

Employment opportunities for Syrian refugees are limited to certain sectors with informal and irregular wage work. While we could not obtain actual foregone wages, a reasonable proxy is recent measures of earned wages among foreign workers in Jordan with minimum skill levels. It is reported that foreign workers in Jordan earn approximately 230 Jordanian Dinars (about $ 324 US dollars) per month (Krafft & Hannafi, 2022). We assume 160 hours per month (40 hours/week for 4 weeks) as full-time equivalent. Using this assumption, the minimum hourly rate for foreign workers in Jordan is $2.03 US dollars. As the caregivers' sample in the evaluation study was 45% Jordanian and 55% Syrian, we weight the overall hourly wage by 0.55 foreign worker's minimum wage and by 0.45 domestic worker's minimum wage. We use this value in

our main analysis. We present the results using the hourly CHV rate ($4.11/hour) in a sensitivity test below. The results are consistent across both values.

The cost of delivering Phone-based RUL to 1,157 households is about $126,110. This cost reflects the incremental value of RUL above and beyond the health and nutritional content discussed on calls with both treatment and control group caregivers. In Table 6, we present these costs per household. The cost of caregivers' time falls below $10 and is shown as <$10 to avoid false precision related to units below $10. As described above, we observed about 2 hours of incremental caregiver time per household total over the 6-month implementation period.

Table 7. Cost of Phone-Based RUL

Estimate Type	**Cost**
IRC Phone-based RUL Delivery	$110
Caregiver Time	<$10
Average Cost per Household	$110

Note: Cost estimates are rounded to the nearest ten to avoid false precision and reflected in constant 2021 U.S. dollars. Cost per household is weighted by the total number of households served.

In Section 6 above, we did not observe differences in caregivers' time spent doing the activities encouraged by the CHV during RUL phone calls. Thus, in our main analyses we do not include caregiver time to deliver the RUL activities. If we assume that caregivers in the treatment group spent 33 minutes and control group spent none, this time would be valued at $140 per household, which would change the average estimated cost per household to $250. While this study did not support this finding, future studies could explore this important pathway and potential cost of Phone-based RUL.

We also examined the distribution of Phone-based RUL costs as they were borne by IRC and caregivers. Table 8 presents the distribution of weighted average costs per household borne by IRC (99%) and by caregivers (1%).

Table 8. Distribution of Phone-based RUL Costs per Household

	Cost to IRC	Cost to Caregivers	Total Cost
Staff & Non-Staff Personnel	$70	< $10	$70
Materials & Equipment	< $10	$0	< $10
Other	< $10	$0	< $10
IRC Operation Support	$30	$0	$30
Total	$110	< $10	$110
Percentage of cost	99%	1%	

Note: Cost estimates are rounded to the nearest ten constant 2021 US dollars to avoid false precision. Cost per household is weighted by the total number of households served. Due to rounding calculations may not add up exactly.

We examine the sensitivity of the cost estimate due to the valuation of caregivers' time based on average wages among domestic and foreign workers in Jordan with minimum skill levels. In this analysis, we value caregivers' time using the hourly rate of pay provided to CHVs. The rationale behind this assumption is to understand how much the program would have cost if CHVs were to do the ECD activities with children instead of the caregivers. In addition, the CHVs were people from the Jordanian and Syrian community who may reflect similar levels of skill and background experiences as the caregivers. Thus, their wage may reflect the market value of caregivers' time.

CHVs were paid $21 US dollars per day and were expected to have 15 working days per month. CHVs worked 6 hours per day for five months and 4 hours per day during the Ramadan month. This translates to approximately 5.67 hours per day across 6 months. There were $2.30 benefits included to CHVs daily rate. Using this assumption, CHV's hourly rate is calculated as $4.11 US dollars.

As shown in Table 9, after applying the CHV hourly rate to caregivers' time (change from $2.15/hour to $4.11/hour), the total costs increased to $134,190 and the average cost per household is $120 after rounding. These changes are small, and we interpret this as indication that the results are not very sensitive to valuing caregivers' time based on foregone wages or CHV pricing. However, if the program is replicated in other humanitarian settings, the value of caregivers' time may be quite different, which could result in larger changes in the costs of Phone-based RUL and the portion of costs borne by families.

Table 9. Cost of Phone-based RUL - Sensitivity analysis of valuing caregiver's time at CHV rate

Estimate Type	Cost
Phone-based RUL Total Program Cost	$134,190
Phone-based RUL Program Cost Per Household	$120

Note: Cost estimates are rounded to the nearest ten to avoid false precision and in constant 2021 U.S. dollars. Cost per household is weighted by the total number of households served.

As stated above, the randomized trial reports an average effect of 0.11 SD reduction in parental depressive symptoms (Rafla et al., 2022). Given that there were no other effects found in the study, we report cost-effectiveness using this effect. Table 10 shows cost and effectiveness of the Phone-based RUL program in reducing parental depressive symptoms. The average effect of RUL is 0.11 SD and the average cost per household is $110. The per-household cost of obtaining a one standard deviation gain in reducing parental depressive symptoms from the Phone-based RUL program is $1,000.

Table 10. Cost-Effectiveness of Phone-based RUL program on parental depressive symptoms

Measure	
Effectiveness (SD) on parental depressive symptoms	0.11
Cost per household	$110
Cost-effectiveness ratio	$1,000

Note: Cost estimates are rounded to the nearest ten to avoid false precision and in constant 2021 U.S. dollars. Cost per household is weighted by the total number of households served. These estimates consider direct costs only.

10. Conclusion

This report presents the cost-effectiveness component of the Phone-based RUL evaluation with an economic perspective and research on costs. We examined the resources required in delivering the Phone-based RUL program in a humanitarian context in Jordan during the COVID pandemic year of 2021. This work contributes to the evaluation literature on RUL programs as one of the few rigorous cost analyses conducted alongside causal impact evaluation.

Based on finance management data and on survey responses regarding implementation, we observed about 8.5 minutes on average were spent discussing RUL components during each call.

This was about 30% of the total time spent on the calls. Relative to the control, which includes about 20-minute phone calls focused on health and wellness, the resources caregivers received through Phone-based RUL are valued at $110 per household.

Importantly, these finding appear to be robust to sensitivity tests regarding the wage rate applied to caregiver time and the time parents and CHVs spent on RUL content on the calls. When these results are combined with the effectiveness study, the program appears to have had a potentially efficient effect on parent well-being. Future work would benefit the field with additional examination of the program's required resources and the mechanisms underlying the effects.

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Appendix A. Caregiver Survey Questionnaire

1) A few times per month, did you receive a call from the CHV or someone from the International Rescue Committee?

2) On those calls, did the CHV encourage you to do the following health activities, such as healthy eating, exercising, breastfeeding, visiting doctors, family planning or getting vaccines for children?
   Y/N

3) If yes, after the call, can you tell us how many days you spent on those health activities tasks on average per week?
   [ ] days

   How many hours did you spend on those health and nutrition activity tasks on average per day?
   a) No time
   b) 10-20 minutes
   c) 21-40 minutes
   d) 41-60 minutes
   e) Between 1-2 hours
   f) Other (specify)

4) On those calls, did the CHV encourage you to do educational activities, such as read, play games, or sing songs with your child?

5) If yes, after the call, can you tell us how many days you spent on those educational or play tasks on average per week?
   [ ] days

   How many hours did you spend on those educational or play tasks on average per day?
   a) No time
   b) 10-20 minutes
   c) 21-40 minutes
   d) 41-60 minutes
   e) Between 1-2 hours
   f) Other (specify)

Appendix B. Ingredients of Phone-Based RUL including health and nutrition messages

Ingredients	Description
Personnel	
Caregivers	Receive the phone calls from the CHVs and conduct the activities with their children
Contractual Staff (No benefits)	
Community Health Volunteer (CHV)	Recruit families and caregivers from their social networks. They place phone calls (2x/month) with caregivers, instructing them on activities
Supervisors	Manage CHVs
Referral Staff	
National Staff (Full benefits)	
Senior RMEL (Research, Monitoring, Evaluation and Learning) Manager	Contributes to designing and building the methodology and tools design with NYU research team, and sensitizes the methods to culture, gender and children age group; Oversees the implementation of selected research methods and data collection tools (surveys); Ensures adherence to the general research design, sample selection, data management and analysis; Manages the meetings with stakeholders and partners who are part of the research process, and ensure that the research scope is in sync with the vision and strategies; Ensures all data protocols are followed in order to ensure high quality data; Manages data collection from the household or individual level to final, clean dataset delivered to NYU; Manages the research budget and spending plans; Communicates regularly with the NYU and education technical unit
Community Health Manager	Develops and reviews the health content and curriculum; Supervises the CH officers and the workflow; Supports in the communication between ECD and community health team
Community Health Officer	Trains the CHVs on the health content; Supervises the CHVs and ensure the targets are reached; Conducts calls observations with the CHVs and caregivers on health content
Monitoring and Research Assistant	Supervise IRC enumerators and supervisors; Ensure they reach target on daily basis; Review the data collection tools, and translate it to Arabic, in addition to ensure that its amended and uploaded on KoBo; Train the enumerators on different data collections tools; Conduct data quality check; Follow-up on the uploaded data and assign the sample of families to the enumerators; Assist with data analysis; Ensure the data are organized and uploaded to the server
ECD Coordinator	
ECD Senior Operations Assistant	
ECD Technical Manager	
ECD Drivers	
ECD Driver-Monitoring-Mafraq	
ECD Driver-Monitoring – Irbid	
ECD Technical Lead	
Research Officer	
Senior Health Officer	
Content Coordinator	
MEAL and research team and Senior Officer	
National Staff Benefits 39%-ECCD National Staff	
National Staff Benefits 39%-Health National Staff	
Training	
CHV training	5-day RUL-specific training held via phone and online. CHV turnover is approximately 1 per week; training costs are higher than planned. All training materials were remotely delivered and uploaded onto tablets.
Facilities	

IRC office in Mafraq	Used to store tablets when not in use. Not used for CHV phone calls.
Materials	
Activity materials	Program activities are designed to be conducted by caregivers at home with readily accessible materials such as a blanket, water bottle, cloth ball, necklace, plastic bottle caps, rattle bottle, blocks, stacking objects, doll, an "object to pull", drawing material (i.e., pen & paper)
Phones (Caregivers)	Phone is required to receive calls from CHVs. Parents are not provided a phone from RUL.
Tablet with SIM card (CHVs)	IRC provides tablets and SIM cards for CHVs. IRC pays data and phone bill cost per tablet.
Other	
Capital Assets	Screen monitors and tablets. Each CHV had a tablet, no special operating system required.

Note—This table reflects the total ingredients for the treatment group who received both RUL ECD content and health and wellness messages. These data were collected during the delivery of Phone-based RUL in Jordan.