



## Executive Summary

Created By  
VillageReach  
February 2014

# Evaluation of the Information and Communications Technology for Maternal Newborn and Child Health Project

*(Chipatala cha pa Foni)*

**VILLAGE REACH**<sup>®</sup>  
STARTING AT THE LAST MILE...

## Introduction

This executive summary presents the results of a mixed-methods evaluation on the effectiveness of a two-year mHealth pilot implemented by [VillageReach](#) as part of Concern Worldwide's *Innovations in Maternal, Newborn and Child Health*. The summary is based on the full evaluation [report](#) created by [Invest in Knowledge](#) (IKI). Key findings from the evaluation include:

1. **CCPF has a statistically significant impact on RMNCH knowledge and behavior.** CCPF users showed statistically significant improvements for the following indicators:
  - ✓ Increased use of antenatal care (ANC) within the first trimester
  - ✓ Increased use of a bed net during pregnancy and for children under five
  - ✓ Early initiation of breastfeeding
  - ✓ Increased knowledge of healthy behaviors in pregnancy including drinking more water and minimizing strenuous lifting
  - ✓ Increased knowledge that some traditional medicines can be harmful in pregnancy
  - ✓ Increased knowledge of maternal health services including number of recommended prenatal visits and what to bring to the health center for labor and delivery.
2. **Users of CCPF are satisfied with the service, citing the ability to access the service from home – saving time and personal costs associated with a trip to the health center.** CCPF is highly utilized in the community and satisfaction is high among these users:
  - ✓ During the initial phase, approximately 20% of women aged 15-49 used the service.
  - ✓ 94% of CCPF users were satisfied with their hotline experience and 98% were satisfied with the tips and reminders service.
3. **CCPF encourages appropriate use of the health system.** Over three-fourths of calls to CCPF's hotline were resolved without a referral to a health facility. As a result, CCPF reduced undue burden on health facilities by encouraging minor ailments to be treated at home or by community health workers.

## Project Description

The pilot project for *Chipatala cha pa Foni* (CCPF), or Health Center by Phone, was implemented by VillageReach as part of Concern Worldwide's *Innovations in Maternal, Newborn, and Child Health* and in partnership with the Malawi Ministry of Health (MoH). From July 2011 to June 2013, the project was piloted in four rural communities in Balaka district in Southern Malawi.

CCPF targets women of childbearing age, pregnant women, and guardians of children less than five years of age. CCPF has two main components:

- **A toll-free hotline** which provides clients with information and advice on issues across the maternal, neonatal, and child health (MNCH) spectrum, and refers callers displaying “danger signs” or serious symptoms for further care at a village clinic, health center, or district hospital. Hotline workers use customized touchscreens that guide them through MOH point-of-care protocols using systems built with Baobab Health Trust.
- **A “tips and reminders”** mobile messaging service that provides regular text or voice messages on MNCH topics. Messages for pregnancy and child health are tailored to the client's week of pregnancy or their child's age.

To generate demand for CCPF, the implementation team recruited and trained community volunteers to promote the service. Community volunteers were also provided with cellphones in order to provide access to CCPF for those without personal phones.

## Methods

IKI utilized a mixed-method approach, combining quantitative and qualitative methods. The following describes the methods for the quantitative and qualitative portions of the evaluation.

### *Quantitative Methods*

For the quantitative portion, a quasi-experimental pre- and post-test design was utilized. A multi-indicator cluster cross-sectional household survey with questions about MNCH knowledge and behaviors was given at baseline (June-July 2011) and two years later at the endline (May-June 2013). The endline survey in the intervention area included questions on exposure to and use of CCPF.

Data were collected in the intervention district of Balaka and the neighboring comparison district of Ntcheu. Health centers in Ntcheu were selected to match the intervention health centers in Balaka based on electricity and phone network coverage, staffing structures, and the services provided.

The primary sampling unit was a village; the sampling methodology was a one-stage cluster sample with stratification at the health center level. Villages were randomly selected so that that each village had the same probability of being selected regardless of population size. Every household with a woman between the ages of 15 and 49 and/or a child under five years of age was attempted for survey. The same villages were surveyed at baseline and endline.

There were a total of 33 MNCH indicators on the household survey; a full list of these indicators is included as Annex A. These indicators were collapsed into seven outcomes to create a mean effect index:

#### Coverage-related outcomes:

- 1.1:** Increased knowledge of home-based and facility-based practices for maternal and child health
- 1.2a:** Increased use of home-based practices for maternal health
- 1.2b:** Increased used of home-based practices for child health
- 1.3a:** Increased use of facility-based services for maternal health
- 1.3b:** Increased use of facility-based services for maternal health

#### Quality-related outcomes:

- 2a:** Increased client satisfaction with facility services for maternal health
- 2b:** Increased client satisfaction with facility services for child health

A pre-analysis plan was created and agreed upon before endline data collection began. Multivariate difference-in-difference regressions were used to determine the treatment on the treated effect on those who used CCPF and to determine the average treatment effect on the entire intervention group. The purpose of the treatment on the treated analysis was to determine the effect of CCPF on those who actually used it. In this analysis, two stages of regression were used. In the first regression, an indicator of treatment status (treatment or control), time (baseline or endline), and their interaction, plus controls at all levels, on the use of CCPF programs were regressed. Using this first stage regression, each individual in the sample's likelihood of using CCPF was predicted. Then the predicted likelihood of use, as well as all controls, on the outcomes of interest were regressed. The resulting estimate is the treatment effect on the treated, sometimes called the local average treatment effect (LATE). The purpose of the difference-in-difference multivariate regression was to determine the average treatment effect on the entire intervention regardless to use of CCPF. Using

this approach, the intervention effect was defined as the difference between the intervention and comparison groups at endline minus the difference between the treatment and comparison at baseline.

### *Qualitative Methods*

Four types of qualitative methods were used for the endline:

- 1 **Focus group discussions:** A total of 12 focus groups discussions were held with women from the intervention area. Women were categorized by their responses to exposure questions on the household survey (those who used CCPF, those who had heard of CCPF but had never used it and those who had not heard of CCPF) and then randomly selected.
- 2 **In-depth interviews:** The “most talkative” woman in the focus groups of women who had used CCPF and women who had heard of CCPF but not used it were chosen for in-depth interviews. The husbands of these participants were also interviewed.
- 3 **Key informant interviews:** Forty-seven key informant interviews were conducted with health center staff, community health workers and members of the district health management team, traditional leaders, and CCPF community volunteers from the intervention areas as well as three members of VillageReach staff.
- 4 **Hearsay ethnographies:** Eight community members from the intervention were selected and trained in hearsay ethnography methods. These community members were asked to pay attention to public conversations about CCPF throughout project implementation and write about them in field journals.

All interviews and focus groups were transcribed and translated and then read by the principle investigator and coded by an IKI consultant. Hearsay ethnography journals were translated and transcribed by IKI and then read by the principle investigator.

## Findings & Discussion

### *Quantitative Findings*

#### Predictors of CCPF Use:

In the intervention communities, 75% of respondents had heard of CCPF by name, compared to 3% of respondents in the comparison communities ( $p < 0.001$ ). Of those who had heard of CCPF, 98% identified CCPF as providing a hotline, while only 21% mentioned that CCPF provides a tips and reminders service. In the intervention communities, 19% of respondents reported using the CCPF hotline and 8% reported using tips and reminders.

A number of indicators were significantly associated with knowledge and use of CCPF. Notably younger, married, literate, and more educated women were more likely to have heard of CCPF. Household wealth, however, was negatively associated with knowledge of CCPF. Among those who had heard of CCPF, more educated women living in homes with a cellphone and a male head of household were more likely to use CCPF. For more details see Table 1.

Table 1. Factors Associated with Knowledge &amp; Use of CCPF

Indicator	Model 1: Heard of CCPF			Model 2: Use of CCPF <sup>1</sup>		
	<i>Observations: 1,988 Pseudo R-squared: 0.07</i>			<i>Observations: 1,653 Adjusted R-squared: 0.04</i>		
	OR <sup>2</sup>	RSE <sup>3</sup>	Sig. Level <sup>4</sup>	OR	RSE	Sig. Level
Age	0.98	0.01	***	0.99	0.01	
Married	0.71	0.31		1.29	0.27	
Education (in years)	1.12	0.02	***	1.09	0.02	***
Able to read	1.58	0.23	***	1.05	0.16	
Number of live births	1.16	0.05	***	1.07	0.06	
Male head of household	1.31	0.51		1.38	0.27	*
Ethnicity: Lomwe	1.43	0.31		0.94	0.21	
Ethnicity: Yao	1.16	0.49		0.93	0.22	
Ethnicity: Ngoni	0.50	0.20	*	0.84	0.11	
Household wealth	0.76	0.06	***	0.87	0.19	
Cellphone in household	1.32	0.44		1.30	0.19	*
Number of children in household	1.00	0.04		1.23	0.16	
Distance from village to health center (kms)	0.99	0.01		0.97	0.01	***
Other MNCH programs in village	1.40	0.16	***	4.41	0.44	***
Distance from health center to hospital (kms)	1.06	0.00	***	1.01	0.00	**
Number of nurses per 10,000 people	1.84	0.31	***	0.87	0.14	
Constant	0.36	0.14	***	0.04	0.03	***

<sup>1</sup> Among those who have heard of CCPF

<sup>2</sup> Odds Ratio

<sup>3</sup> Robust Standard Error

<sup>4</sup> Statistical significance is designated by: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

### Treatment on the Treated

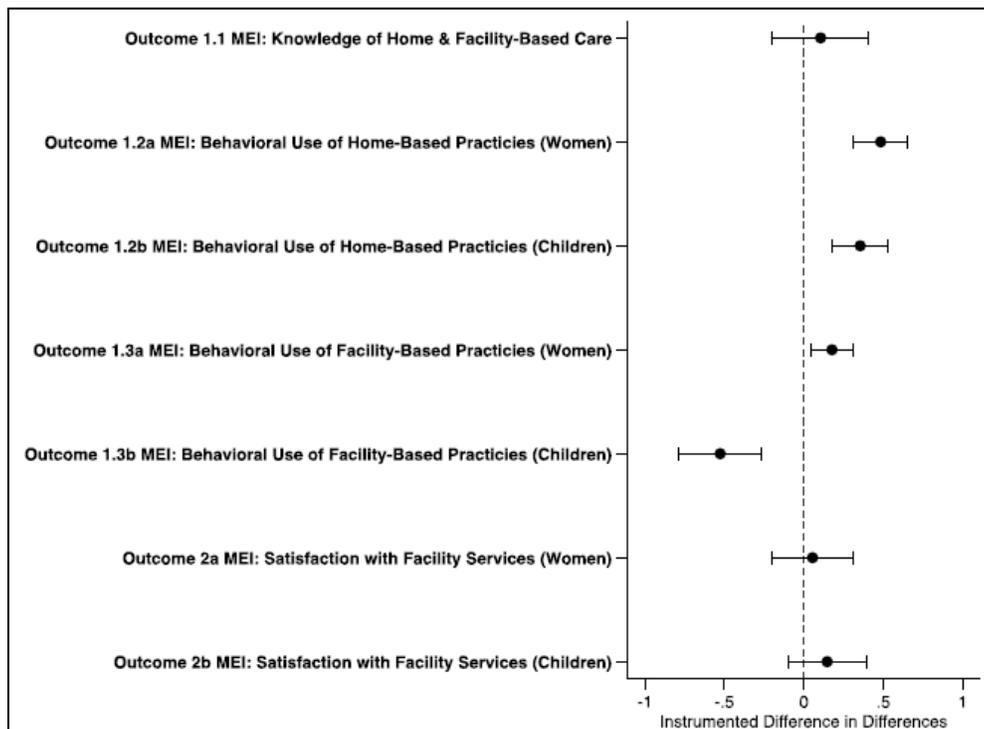
CCPF had a large, statistically significant, positive effect on the behavioral use of home-based practices for women and children. This impact was primarily driven by improvements in breastfeeding within an hour of birth and increased mosquito net usage amongst pregnant women and children. CCPF also led to statistically significant improvements in maternal facility-based practices such as starting ANC within the first trimester.

There were no statistically significant differences between CCPF users and non-users in overall MNCH knowledge or satisfaction with facility-based services, although some individual knowledge indicators showed a significant increase. We expect the lack of difference in knowledge comes from high baseline levels of knowledge leaving little room for improvement. CCPF did not directly impact services offered at health facilities so a lack of increased client satisfaction with services is not surprising.

The analyses found that individuals from the comparison area performed better on facility-based indicators for child health than CCPF users. This impact was primarily driven by fewer CCPF users visiting a health center for children with fever compared to similar non-users. VillageReach hypothesizes that CCPF users were provided with appropriate guidance from the hotline to treat their child's fever at home thereby eliminating the need to visit a health center. Therefore, an increase in uptake of home-based practices would likely result in a decrease in facility-based practices. Because the indicators used to determine facility-based care for maternal health were

entirely comprised of preventive services such as early initiation of ANC and facility-based births, a decrease in facility based care associated with an uptake of home-based practices for maternal health would not be observed in this evaluation. Figure 1 presents difference-in-difference treatment on the treated effects by outcome; results by indicator are presented in Annex B.

Figure 1. Difference-in-Difference Treatment on the Treated Effects

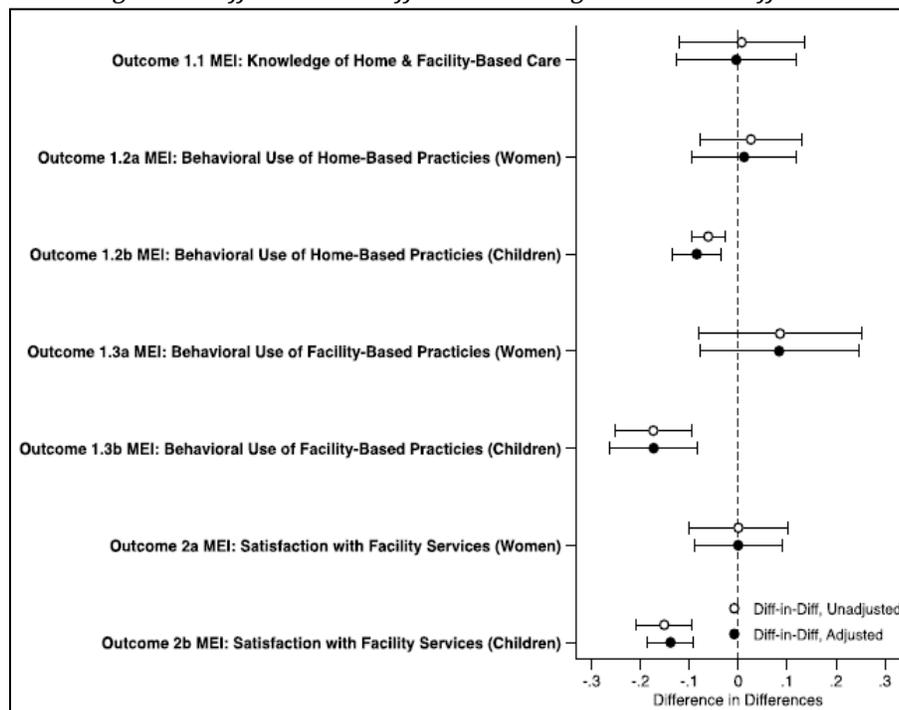


#### Average Treatment Effect

When both users and non-users were analyzed together, there was no statistically significant changes in knowledge, home-based and facility-based practices for maternal health or satisfaction with facility-based MNCH services for women in the intervention area compared the comparison area. This is not surprising because less than one fifth of the entire sample used CCPF; thus we wouldn't expect a change across the entire sample. In addition, many knowledge indicators were very high at baseline leaving little room for improvement.

A negative average treatment effect was observed for home-based practices for child health and satisfaction with facility services for child health. However, these negative treatment effects in most cases appear to be driven by greater improvements in comparison communities than intervention communities rather than declines in outcomes in intervention communities. The confounding effects of other programs in the control communities are likely responsible for these negative average treatment effects. Figure 2 presents difference-in-difference average treatment effects by outcome; results by indicator are presented in Annex C.

Figure 2. Difference-in-Difference Average Treatment Effects



### Qualitative Findings

#### User Experience:

In focus groups, users of CCPF cite convenience of using CCPF at or near home, respectful treatment from hotline workers and better treatment from health center staff when referred from CCPF as the most common reasons for using the service. Table 2 provides illustrative examples of the reasons cited.

In focus groups with non-users, participants cited the number one reason for not using CCPF (among those who had heard of the service) was “no need.” This could be for a number of reasons, such as not experiencing illness or pregnancy during the implementation period, already having the knowledge of how to handle illness or pregnancy or seeking help elsewhere. Some respondents reported not using CCPF because they didn’t have access to the service once the community phone in their village broke. Finally, misconceptions about the service prevented some from utilizing CCPF. For example, rumors that CCPF might be satanic because of the ability so accurately estimate delivery due dates for pregnant women inhibited CCPF utilization in some areas.

Table 2. Reasons for Using CCPF

Reason for Using CCPF	Illustrative Quote
<b>Convenience:</b> Focus group respondents reported that the convenience of being able to call CCPF from or near their homes – potentially saving time and money by preventing a trip to the health center – was a key benefit of CCPF.	“It’s good to call the hotline first, we call the hotline because you can find that there are no drugs [at the health center]... We can be wasting time walking to the health center.”
<b>Respect:</b> Respectful treatment from hotline workers, particularly in comparison to the treatment the respondents felt they received at the health center, came up in almost all focus groups and in-depth interviews.	“[CCPF] tell[s] us the truth about our lives....When the child is sick you are told the truth, like go to the health center or go buy particular drugs, and also the way the drug is to be administered to the child. They say this gently.”
<b>Better Treatment:</b> Respondents perceived that when they were referred to the health center by CCPF, the health center staff provided better treatment.	“There is a difference...when you suffer and go to the health center, for example here we go to Phimbi [Health Center] sometimes we do not receive medicine, or if they give you, they may give you panado [acetaminophen] or LA [lumefantrine-artemether, malaria treatment] and yet the disease you are suffering from cannot be cured by panado or LA. So when you come back home...you dial Chipatala Cha Pa Foni and you tell them about the problem and they advise you to go back to the health center. When you tell health facility staff that you talked to Chipatala Cha Pa Foni worker, there is now a difference in the sense that this time you are given proper medicine while the same people had failed to treat you properly earlier on.”

### Perspectives on the Impact of CCPF

Respondents praised CCPF for improving maternal, newborn and child health. Specifically, respondents noted that CCPF gives good advice and information, that hotline workers treat callers with respect and that calling CCPF saves time and money for those with non-serious issues that can be treated at home with the advice of a hotline worker. Take for example the following quote from a key informant interview with a village headman in the intervention area:

“Out of many women who got assistance from *Chipatala cha pa Foni* most of them were appreciating saying that they are assisted and that many women were getting assistance. For example, [a pregnant woman] was told that she will deliver on 16<sup>th</sup> December and it was found that she really delivered on that day. So she was happy because she got prepared up to the date of delivery and again others are able to know that ‘according to my problem should I go to the health center and [wait in line] to meet the medical assistant?’ But when they call *Chipatala cha pa Foni* they are just told ‘do this, do this’ so they found they get assistance while they are right there at home so they save many things like money.”

The qualitative findings are consistent with the quantitative results: users perceived that they benefited from CCPF and results from the household survey show that they and/or their children did benefit.

### Perspectives on the Implementation of CCPF

Stakeholders perceived a number of challenges to the implementation of CCPF. The three most common challenges listed were:

- a) **Damaged project phones:** A community volunteer in each village was given a project phone in order to provide access to CCPF to those without personal phones. The low-cost phones given to volunteers were not durable, with an estimated 60% breaking during the 2-year pilot. Qualitative data shows that community volunteers in particular found the breaking of phones discouraging as it made it difficult for them to fulfill their role as volunteers.
- b) **Lack of financial incentives:** In response to the question “What were your expectations when you first heard of CCPF?” many stakeholders said they believed they’d receive training allowances.<sup>1</sup> While the community volunteers, hotline workers and some of the village headman did participate in short trainings and receive per diems, the financial rewards were less than some had anticipated. During qualitative interviews, community health workers, who had no official role in the project, were the most likely to bring up incentives and to mention that it affected their motivation to help with the project while community volunteers complained the least about incentives.
- c) **Lack of involvement of traditional leaders and community health works in implementation:** Village chiefs and community health workers reported feeling “slighted” by their lack of official role in the project. Though they were briefed about CCPF by project implementers, IKI postulates that the fact they were briefed after community volunteers were trained was perceived as a lack of respect and a breach of local protocol.

## Limitations

This study design has a number of limitations including:

- a) **Generalizability:** Due to the inclusion criteria of health centers with electricity, mobile phone coverage and two maternity nurses, results from this study cannot be generalized to other health center catchment areas in Malawi or elsewhere.
- b) **Recall bias:** Both the quantitative and qualitative portions of the study are based on respondent self-report, which is vulnerable to failures in memory and desire of respondents to give the most desirable answer.
- c) **Non-equivalent control group:** Baseline data showed there were statistically significant differences between the control and intervention sites in a number of MNCH indicators.
- d) **Confounding effects of other programs:** Balaka was selected in part due to its relatively poor ranking on MNCH indicators. There are number of other organizations and programs working to improve MNCH in the area. There are also a number of other organizations and programs working to improve MNCH in Ntcheu. It is not possible to separate the effects of CCPF from that of other organizations.
- e) **Limitations unique to the qualitative portion:** While facilitators of the focus group discussions made substantial effort to elicit responses from all participants, opinions of the more outspoken individuals (who may be significantly different than their quieter counterparts) were more likely to be discussed. Ethnographers were selected in part because they had performed well in previous evaluations conducted by IKI. They were relatively young and thus members of their social network were more likely to be young. In

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<sup>1</sup> In Malawi, it is common for participants in health or social welfare projects to attend trainings on the topic of the project and their expected role. Attendees of these trainings are typically given a small per diem for their participation.

addition, some of the ethnographers were also community volunteers for CCPF which may have introduced bias.

## Programmatic and Policy Implications

Based on the results from the quantitative and qualitative portions of the evaluation, IKI drew the following programmatic and policy implications:

- a) **CCPF has a statistically significant impact on increasing appropriate MNCH behaviors among women and children who use the service.** The qualitative analyses determined that CCPF users showed an increase in positive MNCH practices such as antenatal care visits during the first trimester, postnatal care visits within in two days, and sleeping under a mosquito net.
- b) **CCPF encourages appropriate use of the health system.** Over three-fourths of calls to CCPF's hotline were resolved with advice without a referral to a health facility. IKI postulates that CCPF reduces undue burden on health facilities by encouraging minor ailments to be treated at home or by community health workers.
- c) **The positive impact of CCPF indicates the need for greater access to mHealth.** A variety of strategies are needed to ensure access to effective mHealth interventions in areas with low cellphone ownership. Increasing access to CCPF would likely increase the positive impact CCPF has on MNCH indicators.
- d) **Knowledge of MNCH practices was high in both control and comparison areas at baseline and endline.** The high level of MNCH knowledge at baseline and endline suggest that interventions targeting behavioral change are needed; CCPF was shown to improve behavioral indicators amongst those who used the service.
- e) **Rigorous evaluations improve understanding of the impact of MNCH interventions.** The methods used in this evaluation allowed for the full picture of CCPF's impact to be understood including the differences in impact on users compared to the entire sample.
- f) **Formative research is crucial when designing MNCH interventions.** Formative research should address not only the need for an intervention but also information that will help implementers anticipate potential challenges in deployment.

Overall, CCPF has demonstrated the potential to improve maternal, newborn and child health while simultaneously relieving undue burden on the health system. In addition, CCPF is replicable and scalable and could produce even larger positive effects if more women and caregivers of children are given access to the service.

## Annex A: Indicators Used to Create Outcomes

**Outcome 1.1:** Knowledge of home-based and facility-based practices for maternal and child health.

- Knows that four ANC visits are recommended
- Understands that first ANC visit should be in first trimester
- Can list the baseline average number of foods pregnant women should eat
- Knows that a woman should drink more water while pregnant
- Can list the baseline average number of things that happen during the ANC visit
- Can list the baseline average number of symptoms that require a pregnant woman to go to the health center
- Knows that pregnant women should do less heavy lifting
- Knows that herbal and traditional medicine are not safe for pregnant women
- Can list the baseline average number of items a pregnant woman should take to the hospital for delivery
- Knows that a baby should return for a check-up two days after birth in a health facility
- Knows that a baby should be taken to a health facility immediately if born at home
- Knows that a baby should be exclusively breastfed until 6 months of age
- Knows that a child should receive a vaccine within a week of birth
- Can list the baseline average number of vaccinations that are important for a child
- Knows that pregnant women should receive a TT vaccine
- Can list the baseline average number of symptoms that require a child to be taken to a health facility immediately

**Outcome 1.2a:** Use of home-based practices among women.

- Used a bed net during pregnancy
- Breastfed child within 1 hour of birth

**Outcome 1.2b:** Use of home-based practices for children.

- Child breastfed exclusively until 6 months of age
- Under 5 child slept under a bed net last night
- Under 5 child receiving oral rehydration salts to treat diarrhea

**Outcome 1.3a:** Use of facility-based services for women.

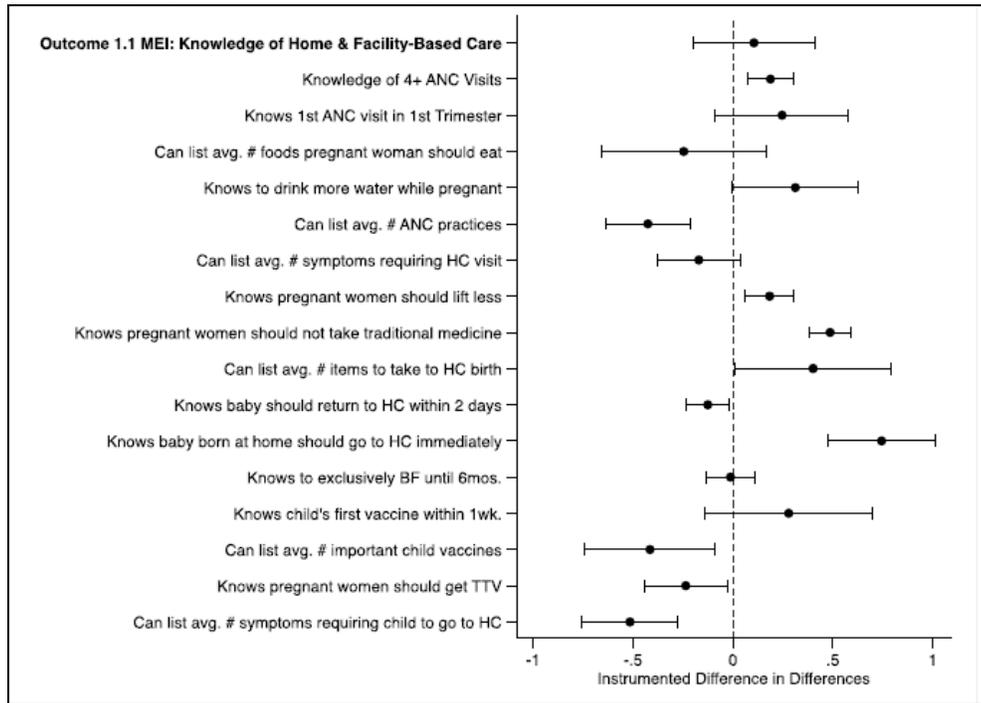
- Received the correct dosage of the TT vaccine during pregnancy
- Received a Vitamin A dose during last pregnancy
- Received the recommended 4 ANC consultations
- Started ANC in first trimester
- Gave birth under the supervision of a skilled birth attendant
- Received one PNC check-up within 2 days of birth

**Outcome 1.3b:** Use of facility-based services for children.

- Child 12-23 months of age is fully immunized
- Child with symptoms of acute respiratory infections (ARI) within previous 2 weeks sought care from health facility
- Child with fever within previous 2 weeks who sought care from health facility

**Annex B: Difference-in-Difference Treatment on the Treated Effects by Indicator**

*Figure 1. Knowledge of MNCH Practices, Difference-in-Difference Treatment on the Treated Effects*



*Figure 2. Use of Home-Based MNCH Practices, Difference-in-Difference Treatment on the Treated Effects*

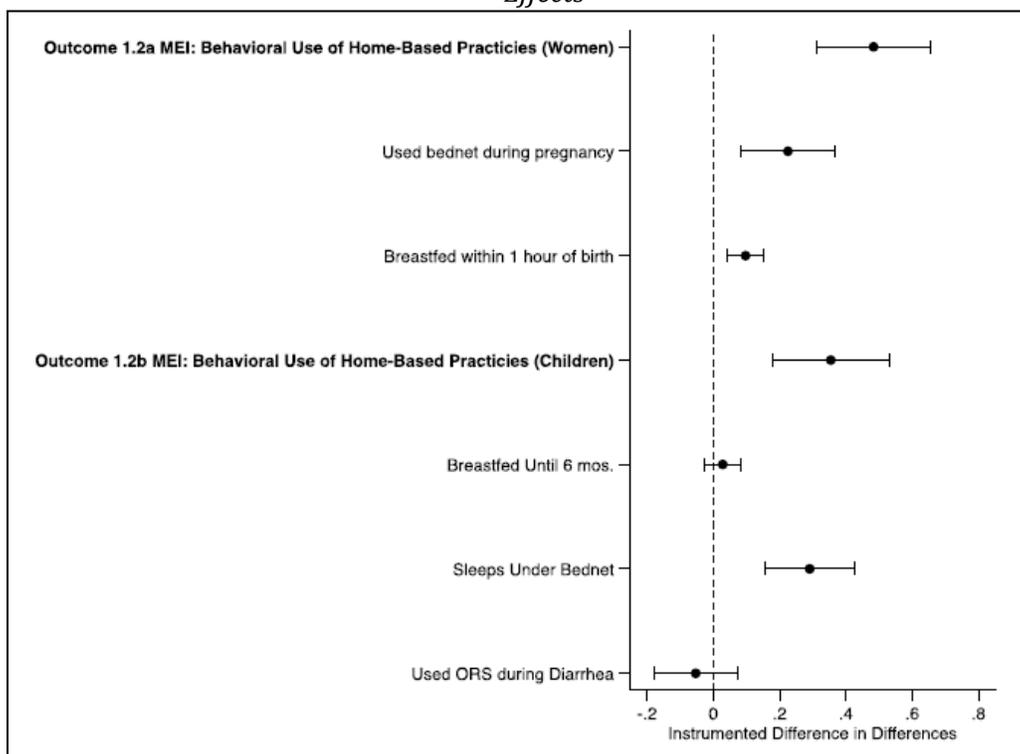
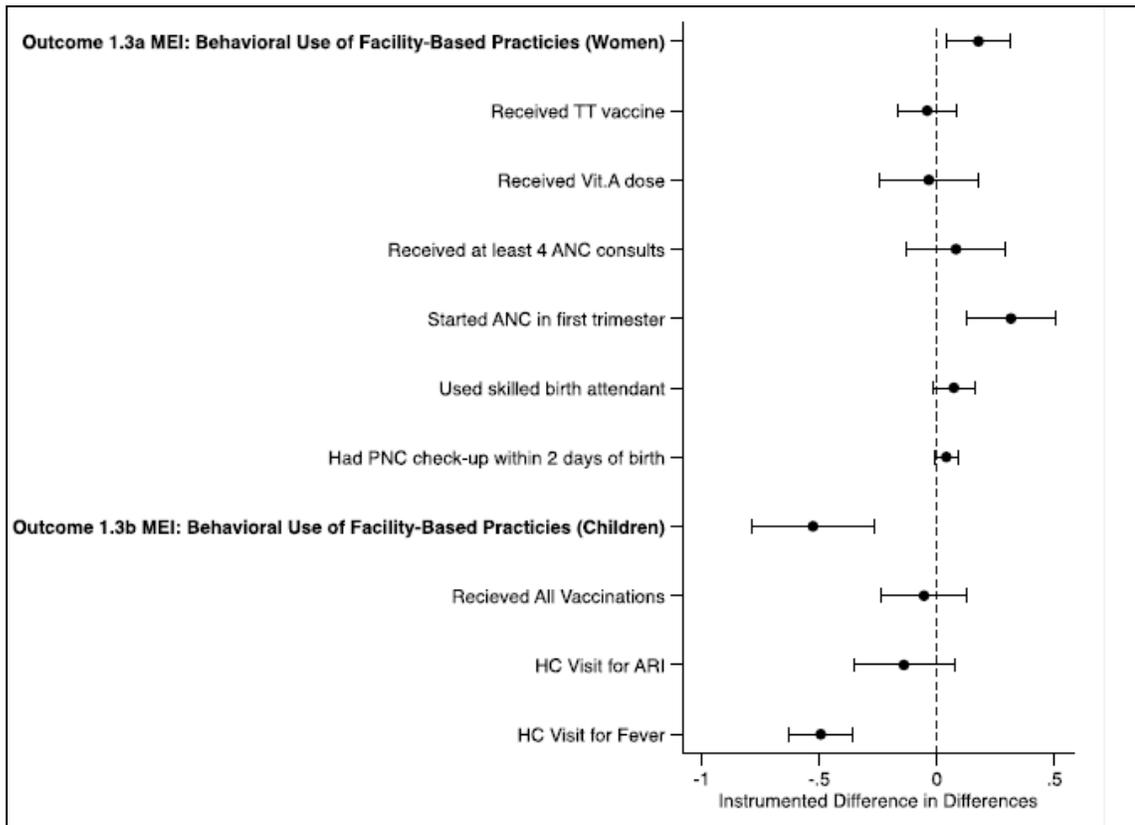
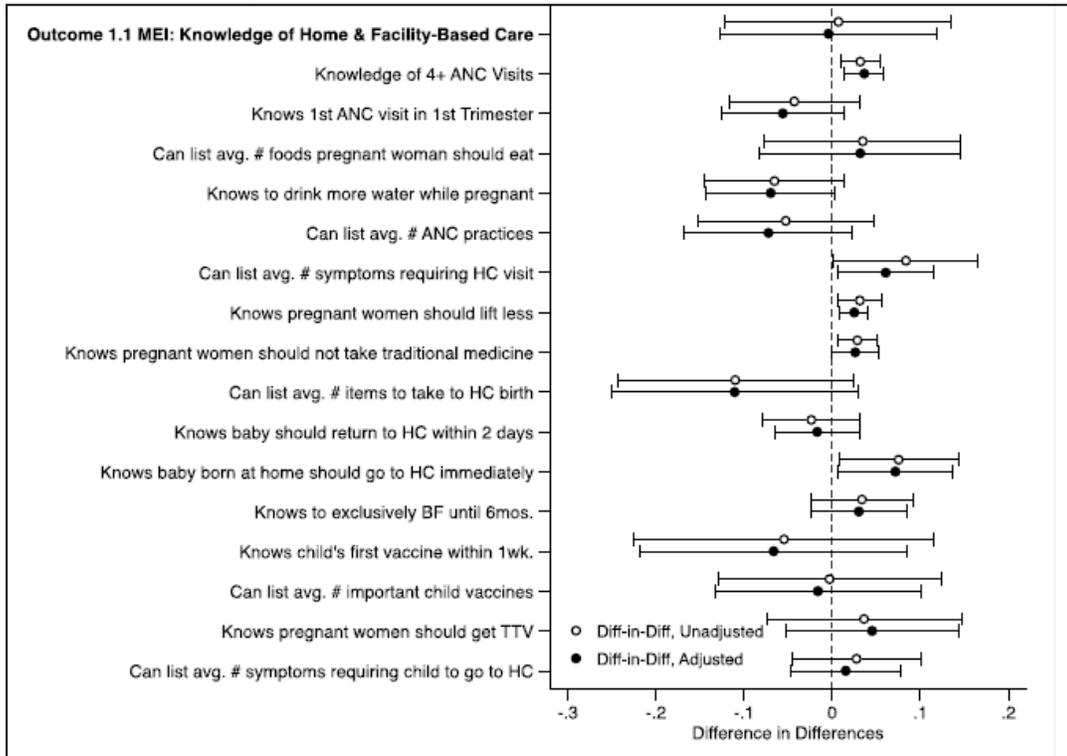


Figure 3. Use of Facility-Based MNCH Practices, Difference-in-Difference Treatment on the Treated Effects



**Annex C: Difference-in-Difference Average Treatment Effects by Indicator**

*Figure 1. Knowledge of MNCH Practices, Difference-in-Difference Treatment Effects*



*Figure 2. Use of Home-Based MNCH Practices, Difference-in-Difference Treatment Effects*

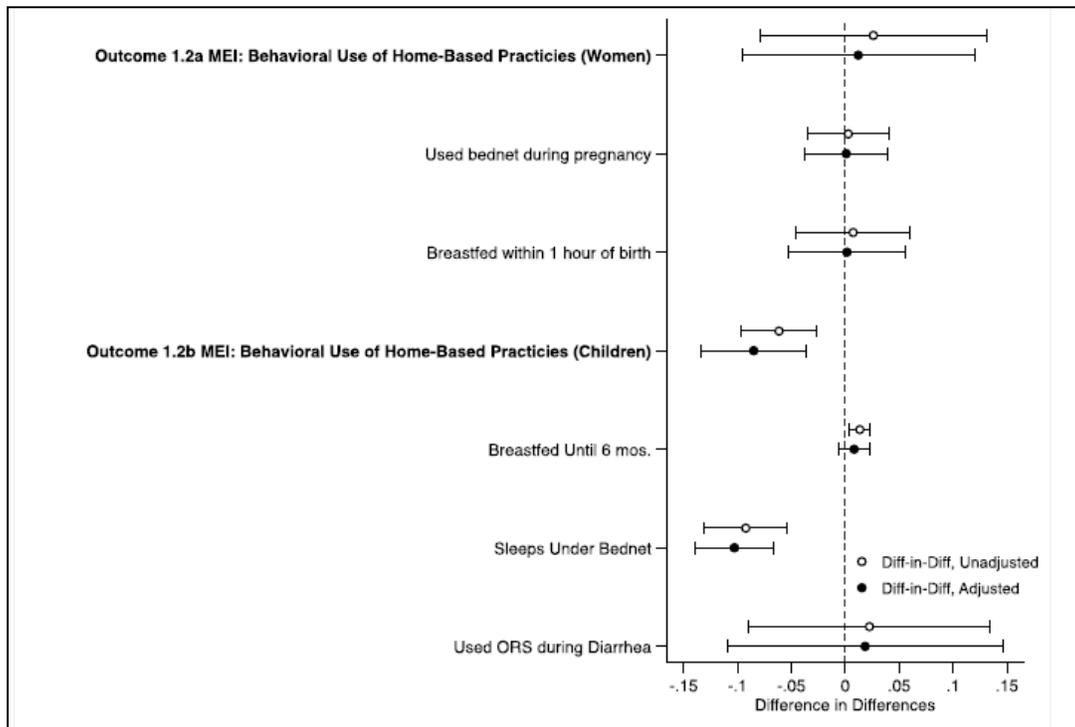


Figure 3. Use of Facility-Based MNCH Practices, Difference-in-Difference Treatment Effects

