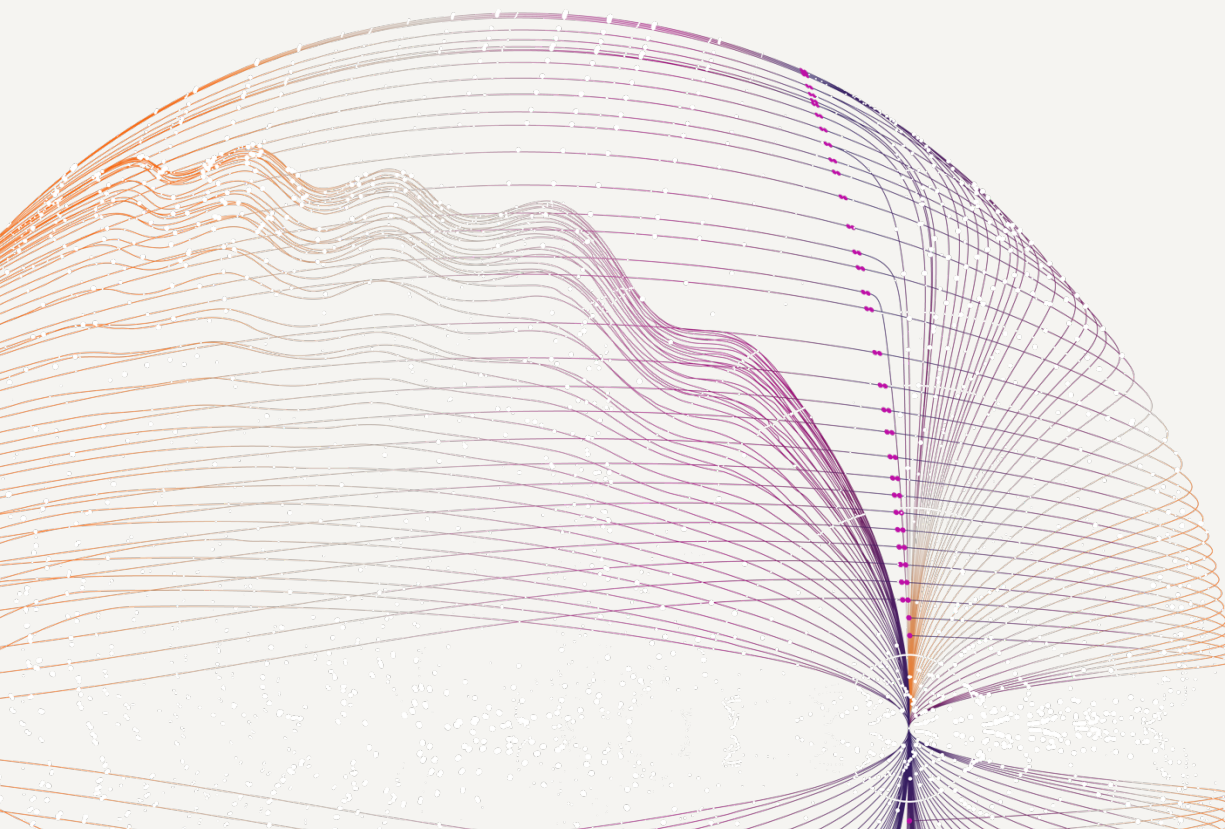# ✳ NORC Global

FINAL REPORT
DECEMBER 2024

FINAL EVALUATION OF THE SALUD MESOAMERICA INITIATIVE

Presented by:
NORC at the University of Chicago

Presented to:
Inter-American Development Bank

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Table of Contents

List of Figures

List of Tables

Acronyms

AMTSL   Active management of the third stage of labor
ANC   Antenatal Care
CHW   Community health worker
CMO   Context-mechanism-outcome configuration
CQI   Continuous quality improvement
FGD   Focus Group Discussion
HCS   Health center staff
IDB   Interamerican Development Bank
IE   Impact evaluation
KII   Key Informant Interview
LHC   Local health center
LHD   Local health department
MCHC   Maternal and child healthcare
MINSAL   Ministry of Health - El Salvador
MoH   Ministry of Health
NORC   NORC at the University of Chicago
QIF   Quality Improvement Fund
RTM   Remote Therapeutic Monitoring
SMI   Salud Mesoamerica Initiative
UNFPA   United Nations Population Fund
UNICEF   United Nations Children Emergency Fund
WFP   World Food Programme

I. Introduction

NORC at the University of Chicago (NORC) was contracted by the Inter-American Development Bank (IDB) to undertake a final evaluation of the Salud Mesoamerica Initiative (SMI), which aimed to reduce maternal and child health inequalities in 8 countries from 2013 to 2023. NORC's mixed methods approach includes a quantitative analysis of all SMI phases (operations 1 to 3) using data collected by the Institute for Health Metrics and Evaluation (IHME) at the University of Washington, supplemented by an analysis of endline (post COVID-19 extension) primary qualitative data collected by NORC in 2024 in Belize, Honduras, and El Salvador.[1] The final report therefore includes a mixed methods analysis using quantitative and qualitative data, coupled with quasi-experimental and pre-post evaluation designs.

1.1. SMI Background

SMI is a regional, 10-year public-private partnership (2012-2022) that brings together Mesoamerican governments, private foundations, and bilateral and multilateral donors to implement key interventions designed to reduce maternal, neonatal, child, and adolescent health inequities for the 20 percent poorest populations in Mesoamerica. The Initiative used a Results-Based Financing model (RBF) to improve the coverage, quality, and use of reproductive, maternal, neonatal, and child health services in Chiapas (Mexico), Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama.

SMI was implemented in three phases known as operations. The First operation (2013-2015) focused on "system readiness" or improving inputs to the healthcare system. The Second operation (2015-2017/18) aimed to expand healthcare coverage and improve healthcare quality. The Third operation (2017/18-2021/22) which was implemented in just four of the eight countries, primarily focused on further improving quality. Due to the COVID-19 pandemic, Belize, El Salvador, Honduras, and Nicaragua received a 12-month extension, with activities concluding in 2023.

Key SMI interventions in addition to those listed in Table 1 included :

- Supporting the development, improvement, and use of health information systems.

- Developing the competencies of service providers (at hospital and community levels) to comply with norms and processes related to maternal, neonatal, and child health (MNCH) care.

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[1] These countries had a 3rd round of operations and therefore respondents had a lower recall bias compared to other countries where the initiative stopped after operation 2. Nicaragua was also included in the countries for qualitative data collection; however, the team did not receive approval from the government of Nicaragua for data collection.

- Enhancing access, quality, and the use of health services across the maternal, neonatal, child, and adolescent lifecycle.

- Offering material incentives to encourage more women to take actions that improve health outcomes, such as attending antenatal and postpartum care visits and delivering babies in hospitals with professional care.

Funding and financial incentives for achieving indicator targets

SMI defined a set of ~10 indicators per operation and per country that measured access to and quality of healthcare services across the MNCH lifecycle.[2] Before each operation, SMI and national governments collaborated to establish performance targets for each indicator.

To meet these targets, each participating country's government contributed funds to implement evidence-based interventions in SMI treatment communities. The Initiative matched the funds each country contributed with funds from the Bill & Melinda Gates Foundation, the Carlos Slim Foundation, the Government of Spain, the Government of Canada, and the InterAmerican Development Bank (IDB), the program implementer. The IDB provided additional resources to implement the interventions, including direct technical assistance like training and capacity building, external performance measurement and systematic monitoring, and regional coordination.

Based on an RBF model, SMI disbursed a monetary incentive to countries that met the performance targets for that operation. This incentive could be used freely within the country's health sector.

Life Cycle Intervention Model

One of SMI's core elements is a system-based approach to healthcare, which provides support to women and children throughout the life cycle. Table 1 presents the MNCH lifecycles, associated outcome indicators for which performance targets were set, and main activities SMI conducted or supported at each level of care.

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[2] Life cycle phases included pre-conception, pregnancy, delivery, postpartum, neonatal, and care for children 1 to 59 months. Each country selected its own indicators; they were not uniform across all eight SMI countries.

Table 1. MNCH life cycle, outcome indicators and mechanisms

Life cycle	Indicator(s)	Community-level activities	Clinic-level activities	Hospital-level activities
Pre-conception	• Modern contraceptive prevalence rate	• Community health workers (CHWs) training to engage with women of reproductive age (15-49) effectively. • Use of referral tools to encourage visits to health facilities. • Distribute informational materials during community visits. • Launch a communication campaign on family planning and HPV vaccination at mobile sites, schools, and community fairs.	• Continuous training and coaching for nurses on family planning methods. • Ensure the availability of family planning options, including bilateral tubal ligation (BTL). • HPV vaccination and testing.	•
Pregnancy	• Coverage of antenatal care (4+ visits) • First antenatal care visit during first trimester • Antenatal care with quality	• Early pregnancy detection and rapid pregnancy testing. • CHWs refer pregnant women to ambulatory care centers for early prenatal care. • Training for CHWs and midwives on warning signs during pregnancy.	• Promote birth planning to encourage hospital births. • Vaccinate pregnant women against COVID-19. • Institutionalize contraception counseling.	• Improve management of high-risk pregnancies and antenatal care. • Implement postpartum contraception counseling.
Delivery	• Coverage of institutional delivery care by qualified attendant • Delivery care quality (active management of the third stage of labor) • Management of obstetric complications with quality • Obstetric complications (sepsis, hemorrhage, severe pre-eclampsia, and eclampsia) handled according to norms	• Disseminate materials on safe deliveries. • Promote continuous communication and engagement between nurses and women to monitor pregnancies.	• Disseminate materials on safe deliveries. • Promote discussions on delivery planning with parents. • Emphasis on follow-up appointments, birth spacing, and family planning.	• Continuous training for staff on maternal and child health (MCH) care. • Training on key stages of labor/delivery and post-partum care, including the use of partographs and oxytocin and the active management of the third stage of labor (AMTSL). • Early identification and management of obstetric complications according to norms.

Life cycle	Indicator(s)	Community-level activities	Clinic-level activities	Hospital-level activities
Neonatal	• Neonatal complications (prematurity, low birth weight, asphyxia, and sepsis) handled according to norms • Routine newborn care with quality • Postpartum care within 7 days of birth (for babies).	• Encourage nurses to visit and monitor new mothers at home. • Encourage nurses to maintain constant communication with new mothers.	• Support staff in providing Neonatal Care (NNC) according to norms. • Refer high-risk cases immediately.	• Promote norm-based practices among obstetricians and neonatology staff. • Train on identifying neonatal complications. • Encourage pediatrician review of all newborns.
Postpartum	• Immediate post-partum care with quality • Post-partum contraception • Post-partum care within 7 days of the delivery (for women)	• Promote post-partum home visits within 7 days. • Registered nurses in identifying post-partum complication warning signs.	• Promote check-ups at 7 and 14 days.	• Obstetric care teams perform post-partum monitoring of vital signs for the first 2 hours. • Review for active bleeding during post-partum monitoring.
Care for children 1-59 months	• Home treatment of diarrhea with ORS and zinc • Deworming 2+ times a year for children 12-59 months • Consumption of micronutrients in children 6-23 months • Anemia prevalence in children 0-23 months and 0-59 months	• Improve child growth and development monitoring • Promote exclusive breastfeeding practices. • Guide mothers in identifying danger signs in children's growth. • Distribution of ORS and zinc • Introduction of micronutrients.	• Conduct growth and development checkups. • Conduct home visits. • Manage low birth weight cases according to established norms. • Implement functional vision assessments (FVA) for children. • Apply an integrated approach to illness management. • Treat child diarrhea effectively	• Address complications referred from lower levels of care.

1.2. Evaluation Questions

The Final Evaluation of the Salud Mesoamerica Initiative focuses on six Evaluation Questions (EQs).

- EQ 1: What was the magnitude of change on maternal, neonatal, and child health outcomes in SMI target areas, and to what extent can changes be attributed to SMI?

- EQ 2: How did SMI influence changes in coverage, quality of care, and health systems performance?

- EQ 3: What are the prospects for sustainability of SMI interventions and results?

- EQ 4: What components of SMI influenced whether outcomes were achieved or not according to stakeholders?

- EQ 5: What was the effect of COVID-19 on coverage and quality of MNCH services in the poorest regions?

- EQ 6: What was the role of the IDB as a change agent supporting health systems and health service provision improvement?

For the first question, NORC analyzed 18 outcome indicators related to the MNCH life cycle. These indicators were selected in agreement with the IDB team and are as follows:

1. Coverage of antenatal care (4+ visits): binary indicator equal to 1 if the respondent had at least four ANC visits with a physician or professional nurse, and 0 otherwise, as reported during household surveys.

2. First antenatal care visit during first trimester: binary indicator equal to 1 if the woman had her first ANC during the first 12 weeks of her pregnancy as reported in household survey.

3. Antenatal care with quality: indicator for having conducted lab tests (urine and blood) and clinical tests (measurements of blood pressure, weight, fundal pressure and fetus heartbeat) during the ANC visit as reported during household survey. The quality indicator is a binary variable, where a value of 1 indicates that all required tests and measurements were conducted, and 0 indicates otherwise. ANC with quality indicator defined only for women that had at least once antenatal care visit.

4. Coverage of institutional delivery care by qualified attendant: binary variable indicating delivery by a doctor or professional nurse, as reported during household survey.

5. Delivery care with quality: indicator measured by the active management of the third stage of labor, based on health facility surveys. This binary indicator specifically tracks whether women were administered oxytocin or another uterotonic following birth.

6. Management of obstetric complications with quality: binary indicator assessing whether women with obstetric complications (sepsis, hemorrhage, severe pre-eclampsia and eclampsia) were treated according to the norms, as reported in health facility surveys.

7. Immediate postpartum care with quality: binary indicator measuring whether institutional postpartum patients received immediate postpartum care according to best practices within two hours after birth and at discharge, based on health facility records.

8. Postpartum contraception: binary indicator assessing whether contraceptive advice was provided after delivery as reported in household surveys.

9. Postpartum care within 7 days of the delivery (for women): indicates checkup occurred within seven days of the delivery, as reported in household surveys.

10. Routine newborn care with quality: binary indicator assessing whether neonates received immediate neonatal postpartum care according to standards from medical personnel after birth, based on health facility surveys.

11. Management of neonatal complications with quality: binary indicator evaluating whether neonates with birth complications (prematurity, low birth weight, birth asphyxia, or sepsis) were treated in accordance with established guidelines, as reported in heath facility surveys

12. Postpartum care within 7 days of birth (for babies): indicates whether infants received their first postnatal checkup from skilled personnel within seven days of the delivery, as reported in household surveys

13. MMR vaccination complete: MMR compliance is defined for children between 1 and 6 years old that had received their MMR vaccinations (measles, mumps and rubella) according to their vaccination card. If the information is missing in the vaccination card this indicator is missing; if the card is missing the MMR compliance indicator is 0.

14. Vaccinations full compliance according to Card: Full compliance is defined for children between 1 and 6 years old that had received their vaccinations mandated by each country. If the information is missing in the vaccination card this indicator is missing; if the card is missing the MMR compliance indicator is 0.

15. Home treatment of diarrhea with ORS and zinc, as reported in household surveys.

16. Deworming 2+ times a year for children 12-59 months binary variable indicating whether children received at least two doses of deworming medication in the last 12 months, as reported in household surveys

17. Consumption of micronutrients in children 6-23 months: equal to 1 if the child consumed at least 50 sachets of micronutrients in the past 6 months, and 0 otherwise, as reported in household interviews.

18. Anemia prevalence in children 0-23 months and 0-59 months, as reported in household surveys

II. Data and Methodology

2.1. Data

As stated earlier this final evaluation analyzes secondary quantitative and primary qualitative data. Figure 1 shows that quantitative data was collected in the eight SMI countries between each operation, namely in 2013 (baseline survey), 2015 (first follow-up survey), 2017-18 (second follow-up survey), and 2021-22 (third follow-up survey only in Nicaragua, Honduras, El Salvador, and Belize).[3] These quantitative data from households and health facilities in intervention areas were gathered to assess whether each country met its outcome targets and to evaluate the SMI. Quantitative data from comparison areas were also collected in Chiapas, Guatemala, Honduras, and Nicaragua. The Institute for Health Metrics and Evaluation (IHME) at the University of Washington designed all data collection protocols, calculated samples and collected that data. The IDB provided these secondary quantitative data to NORC.

SMI targeted the poorest quintile of municipalities in each country, which encompass the sample frame for the treatment group. For the countries where a comparison group was surveyed, the sample frame for these comparison groups were the municipalities in the second poorest quintile. For the household survey, all municipalities selected by SMI for treatment, as well as comparison municipalities of similar characteristics in Guatemala, Nicaragua, Honduras and Chiapas (Mexico), were part of the sampling frame. In each municipality, random samples of household segments were selected, and a census was conducted in each of these segments to identify eligible households, defined as households where there is at least one women 15 to 49 years old or one child under 5 years. In each segment random samples of eligible households were surveyed (Mokdad et al. 2015).). A similar multi-state sampling procedure was followed at each wave of data collection. Two exceptions were Belize, where a convenience sampling approach was followed due to budget restrictions; and Costa Rica, where instead of households, schools were surveyed, as SMI in this country focused on adolescent reproductive health. The household survey included items on household characteristics, maternal and child health indicators, and anthropometric measurements. As shown in Figure 1, household surveys were conducted at baseline, follow-up 2 and, for the four countries that participated in operation 3, follow-up 3.

For the health facility survey, samples of ambulatory, basic, and complete facilities were selected from available lists in both SMI municipalities and comparison municipalities when available. In most cases, all basic and complete facilities in the study area were included to ensure sufficient sample size for medical record review. Ambulatory facilities were then selected to complete the sample. When the number of facilities exceeded the desired sample size, a random selection was made from the list. For follow-ups

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[3] Please see sample sizes by survey round and country in Annex 1.

, the selection of ambulatory facilities also considered stratification based on whether the facilities had been visited in previous rounds of measurement. The survey involved a review of medical records covering the previous five years, alongside an interview questionnaire and an observational checklist. Data from the health facilities were collected at baseline, followed by two to three subsequent rounds: follow-up 1, follow-up 2, and, for the four countries participating in operation 3, follow-up 3.

Figure 1. Data Collection Timeline

In addition to the quantitative data collected by IHME, NORC collected and analyzed qualitative data in Belize, El Salvador, and Honduras in 2024. We conducted 69 key informant interviews (KIIs) with the Ministries of Health (MoH) and Ministries of Finance (MoF), IDB, donors, local health departments, hospitals and health center staff, and 27 focus group discussions (FGDs) with community health workers, midwives, mothers and their partners or other family members. In addition, NORC interviewed four representatives of IDB's development partner organizations. Table 2 shows the number of KIIs and FGDs conducted in each country[4].

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[4] Please see a disaggregation by respondent type and treatment or comparison area in Annex 2.

Table 2. Key Informant Interviews and Focus Group Discussions per country

Country	Key Informant Interviews	Focus Group Discussions
Belize	17	10
El Salvador	26	
Honduras	26	17
Other*	4	
TOTAL	**73**	**27**

* Non-country specific KIIs with donors/development partners.

The KIIs gauged information primarily from country specific agencies on changes in coverage, quality of care, the effectiveness and sustainability of SMI interventions and results, the effect of COVID-19 on coverage and quality of MNCH, and the role of the IDB as a change agent supporting health systems and service provision improvement. The FGDs gathered data about coverage and quality of MNCH services, the effects of the COVID-19 pandemic on the provision of these services, lessons learned, and recommendations to improve the SMI process.

2.2. Methodology

We use a mixed methods approach that integrates both quantitative and qualitative data to provide a comprehensive understanding of the research questions. This helps us understand how implementing specific SMI elements may have contributed to the outcomes documented with quantitative data, and any contextual factors that may have influenced the role of SMI components to achieve the intended outcomes, in Belize, El Salvador, and Honduras. In addition to quantitative findings – the what – a qualitative focus on the context helps clarify the mechanisms and processes through which such changes or impacts occurred – the how. The qualitative inquiry also shed light on the conditions that affected access and quality for local recipients – for whom – and on conditions and gaps for sustainability, as well as any lessons learned or good practices under SMI. Overall, this approach recognizes the strengths and weaknesses of both quantitative and qualitative methods and seeks to leverage their respective benefits to gain deeper insights into complex research problems.

Quantitative methodology

Impact Evaluations

We use data from the four countries for which comparison data was collected, namely Nicaragua, Honduras, Guatemala, and Chiapas (Mexico), to estimate the impact of SMI. In these countries, treatment assignment was based on poverty and other wellbeing indicators, such that the poorest 20 percent of municipalities in each country were selected for treatment. Comparison municipalities were, in general, selected from the second quintile of poorest municipalities.[5] Given this treatment assignment protocol, we conduct a difference-in-differences

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[5] One exception to this treatment assignment strategy was Honduras, where treatment was assigned randomly at the *Gestores* level.

(DID) analysis to evaluate the impact of SMI. DID is a well-known evaluation method that estimates the differences in the changes between baseline and endline for treatment and comparison groups. DID assumes parallel trends for the outcomes of interest in intervention and comparison areas in the absence of treatment.

Available survey data varies by country (see Annex 1). For example, there is household data for all for impact evaluations countries for baseline and operation 2, but for operation 3 there are data only for Nicaragua and Honduras, since only four of the eight countries participated in operation 3. For each country we will estimate results using all the data available for each country. In general, for household-based outcomes, we will estimate:

$$y_{hmj} = \alpha + \sum_{j=2}^{3} \beta_j \, D_m W_j + \delta_j + \theta_m + \mathbf{x}'_{hmj} \boldsymbol{\varphi} + u_{hmj} \qquad (1)$$

Where y_{hmj} is the outcome of interest for household h in municipality m and year j, Dm is a municipality-level treatment indicator, W_j is an indicator variable for operation j, δ_j and θ_m are year and municipality fixed effects, respectively, $\mathbf{x}'_{hmj}$ is a vector household characteristics (e.g., household size, parental education and other variables available in the data sets), u_{hmj} is an error term and α, β_j, and $\boldsymbol{\varphi}$ are parameters to be estimated. The parameters of interest are β_j; which reflect the impact for operations 2-3. Specifically, the coefficients reflect the impact of offering the services, often called intent-to-treat parameter. Notably, β_3 reflects the impact during Covid-19. Standard errors were clustered at the municipality level for the household survey regressions, and at the facility level data for the health facility data.[6]

The model in equation (1) can also be used to estimate impacts on facility-sourced outcomes.

We also explore analyzing program impacts pooling two or more countries in the same regression. This provides a greater sample size; however, it forces program impacts or other parameters to be the same across countries, reducing the flexibility of the specification relative to the country-specific analysis.

Treatment effect heterogeneity. It is possible that SMI had different effects across different groups in the population. For example, changes in complete vaccination schedules may have been larger among the poorest children in the beneficiary population. To assess this treatment heterogeneity, we divide the sample by poverty level into two strata and estimate regressions for each stratum as agreed during the designed phase of this research.

Comparison group contamination. In Chiapas and Nicaragua some comparison areas were treated because some ambulatory facilities located in comparison municipalities were part of the catchment area of treated higher-level facilities (Basic and Complete). This implies that patients in comparison municipalities could be referred to treated Basic or Complete facilities. To assess the sensitivity of the impact evaluations results to this contamination, we estimate regressions excluding the contaminated municipalities.

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[6] In the case of Honduras standard errors are clustered at the *Gestores* level. For regressions using health facility data that include data from operation 3 errors were clustered at the facility/year level, because facility identifiers were not available for operation 3.

Pre-Post Analysis

For all evaluation countries we estimate MNCH lifecycle indicators over time. We show the evolution of the lifecycle indicators between baseline and operation 2 for all countries and, separately, for the countries that participated in operation 3, the evolution of the indicators between baseline, operation 2 and operation 3. We also show results by country, for the countries where qualitative data were collected, namely Honduras, Belize and El Salvador, as qualitative and quantitative data are integrated in the analysis. Results for all countries can be found in Annex 4.

Qualitative Analysis and Mixed Methods

This evaluation uses a convergent mixed-methods approach to inform our findings. We started by reviewing SMI documentation, having discussions with SMI country staff to gain further understanding of the interventions in each context, and conducting initial quantitative analysis of the existing data collected. Results of the document review and preliminary quantitative analysis guided the design of a master qualitative protocol of KIIs and FGD instruments. NORC then conducted qualitative data collection and analysis and finalized the analysis of quantitative data. Finally, we used a mixed-methods approach to triangulate the quantitative and qualitative findings.

Figure 2. Convergent Mixed-Methods (M-M) Approach
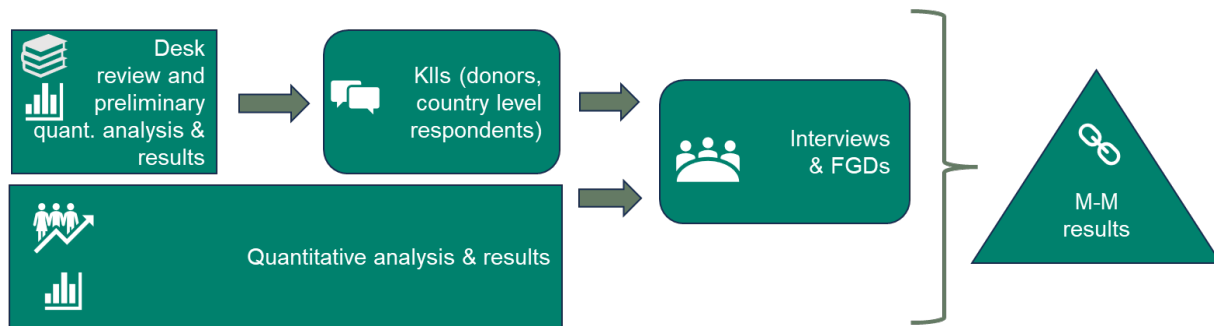
Adapted from Creswell, J. W., & Clark, V. P. (2017).

NORC used qualitative information to shed light on the processes through which the quantitative results materialized and for whom. Since countries varied in some interventions, the NORC team developed qualitative protocols and probes based on specific interventions in each of the three countries where data was collected – Belize, Honduras and El Salvador. Thus, the convergent mixed-methods approach expanded the explanatory power of the quantitative findings when combining them with qualitative data. We employed this approach for EQ 2 and EQ 5 (see Table 3 below).

For EQ 2, we used two mixed-methods approaches: a context-mechanism-outcome (CMO) framework and directed content analysis. CMO emphasizes the role of implementation *context* and specific SMI interventions aimed to influence *mechanisms* of MNCH to achieve intended *outcomes*. A CMO framework helps articulate a program logic that examines what works, for whom, and in what circumstances[7].

In Belize and Honduras, in addition to the qualitative information collected on all 6 life-cycle stages noted above, NORC undertook a Context-Mechanism-Outcome (CMO) configuration analysis. We examined delivery care with quality in hospitals in Belize and antenatal coverage and care with quality in Honduras. Our team used the CMO framework to inform the design of the instruments for local data collection in Belize and Honduras and increase the granularity of information we collected related to the selected two MNCH lifecycle outcomes. The text box on the side provides a short summary of delivery care mechanisms in Belize and antenatal care (ANC) mechanisms used by SMI in Honduras.

Findings on all other quantitative outcome indicators for EQ 1 are further deepened by using directed content analysis of the qualitative data and presented jointly in EQ 2. As indicated in Table 3, for all other evaluation questions, we used a standalone quantitative or quantitative approach.

Delivery Care in Belize: Pioneering Improvement of Quality of Care and Performance Incentives: SMI implemented several strategies, including training hospital staff to become trainers themselves, ensuring that all obstetrics and neonatology teams were well-versed in following protocols and norms for MNCH care. SMI also promoted the use of oxytocin—a uterotonic drug to prevent post-partum hemorrhage— for the first time, alongside the active management of the third stage of labor protocol. Other SMI activities included promoting the use of partographs to monitor mother and fetus during labor to identify potential complications; providing training to recognize and manage newborn complications either at birth or within the delivery ward; and standardizing pediatric check-ups for all newborns. Belize had no quality indicators before the introduction of SMI in 2014. SMI promoted the creation of the Quality Innovation Fund to offer in-kind incentives for maternal and child health units at hospitals, aiming to improve the supply and quality of care. The quality improvement strategy included the development of data collection and visualization tools, monthly quality assessments, the implementation of targeted improvement plans, and the mapping of optimized care processes.

Antenatal Care in Honduras: Coverage and Quality Care Improvement: SMI's approach to increasing antenatal visits in intervention areas included engaging the community through informative campaigns on antenatal care. This effort involved familiarizing women of reproductive age and their families with Community Health Workers (CHWs) to build trust. CHWs provided information on the benefits of ANC and hospital deliveries,and referred pregnant women to ambulatory care centers. The goals were to increase the number of antenatal appointments women attended in general, the visits they made before the 13th week of pregnancy, and expand coverage in rural areas. SMI also provided training to health facilities staff and CHWs in the use of rapid diagnostic tests.

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[7] A CMO framework helps analyze the relationship between context, mechanisms, and outcomes with the purpose of discovering whether a theory of change (ToC) that drives mechanisms or context contributes to a certain outcome. CMO frameworks are grounded on the principles of Emergent Realist Evaluation (ERE), a theory-driven approach to evaluation that drives the inquiry of what works in social interventions according to related ToC; in what contexts interventions work; and for whom (Mark, Henry, & Julnes, 1998).

Table 3. Evaluation Questions and Analytical Approach to Answers

Evaluation Question	Analytical Approach
1. What was the magnitude of change on maternal, neonatal and child health outcomes in SMI target areas, and to what extent can changes be attributed to SMI?	All SMI countries: Quasi-experimental and pre-post evaluation designs **[Quantitative]**
2. How did SMI influence changes in the performance, coverage, and quality of health care?	Convergent **mixed methods** + Directed content analysis **[Qualitative]** Belize, Honduras: CMO for selected indicators
3. What are the prospects for sustainability of SMI interventions and results?	Directed content analysis **[Qualitative]**
4. What components of SMI influenced whether outcomes were achieved or not according to stakeholders?	Directed content analysis **[Qualitative]**
5. What was the effect of COVID-19 on coverage and quality of MNCH services in the poorest regions?	Convergent **mixed methods** + Directed content analysis **[Qualitative]**
6. What was the role of the IDB as a change agent supporting health systems and health service provision improvement?	Conventional content analysis **[Qualitative]**

Directed content analysis is a deductive process that uses pre-determined categories of knowledge about the phenomenon of interest to design data collection instruments and organize the information collected[8]. Such categories are derived from the program logic or theory of change, social science theories, or grounded theory of a program or intervention. NORC used quantitative outcomes and the review of SMI documents to identify these pre-determined categories and frame the qualitative inquire across such categories. To avoid biases, NORC collected information from several sources and triangulated findings across them.

In EQ6: the role of the IDB as a change agent in health systems and care services NORC used a conventional content analysis[9] which is inductive by nature. It does not rely on fixed pre-determined categories and allows for an open inquiry on the processes, experiences, and lessons that actors experimented in their interaction with SMI interventions and the structures around those interventions. Due to its exploratory nature, conventional content analysis often requires additional time to analyze all emergent themes and their connections and might not be ideal to gain a full understanding of the phenomenon at hand. For this reason, NORC only used this inductive approach to address one evaluation question (EQ 6) aiming to explore a concrete theme from multiple perspectives of experience across actors and countries.

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[8] Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. Qualitative health research, 15(9), 1277-1288.
[9] Idem.

2.3. Limitations

Comparison areas. For Honduras, El Salvador, Nicaragua, and Chiapas (Mexico) data were collected from SMI and comparison areas. This allows us to estimate the impact of SMI using a difference in difference strategy. However, the selected comparison areas do not serve as an ideal counterfactual. In Chiapas and Nicaragua, some comparison areas were partially treated, as ambulatory facilities in these municipalities fell within the catchment areas of treated higher-level (Basic and Complete) facilities. Consequently, patients from comparison municipalities could still be referred to treated Basic or Complete facilities.

In some cases, comparison areas received interventions supported by other organizations that were similar to those implemented by SMI. For instance, in Honduras, the World Food Programme (WFP) worked on child micronutrient programs, and the United Nations Population Fund (UNFPA) supported an antenatal care initiative in comparison areas.

Finally, in some cases, national health authorities adopted and implemented healthcare guidelines and protocols developed under SMI on a nationwide scale. In Honduras, for example, the Ministry of Health (MoH) incorporated new obstetric standards and guidelines—initially adjusted with SMI support—and mandated their use across the country. Additionally, effective practices from SMI areas were sometimes adopted in comparison areas by local health workers. For instance, in El Salvador, health workers in comparison areas began using the "hoja filtro," a form for the early detection of pregnancy and other conditions. This type of contamination in the comparison areas tended to increase over time.

The partial treatment in comparison areas, the support from other organizations, and the scaling of some of the SMI interventions nationally, all would tend to underestimate the effectiveness of SMI on outcomes.

Sample size. For certain indicators, sample sizes are insufficient to produce precise statistical results. This generally applies to indicators related to deliveries, and especially to those concerning maternal and neonatal complications. Similarly, estimating treatment effect heterogeneity by poverty level was challenging because stratifying reduced even further the sample sizes.

Before-after analyses: Inferring the treatment effect for countries with no comparison group is difficult because without a counterfactual we do not observe what would have happened in the absence of treatment. The analysis is especially challenging in the case of Belize, where each wave of data collection is not representative of the same population, given the convenience sampling approach used. For example, the education of women included in the baseline sample is higher than the education of women included in the operation 2 survey. In the operation 3 sample, women's education is even lower than in operation 2 sample. Health seeking behavior tends to be correlated with education and therefore these changes in sample composition may affect outcomes.

<u>Staff turnover and reference period</u>. High turnover among health authorities and staff over the years posed a challenge across all countries for qualitative data collection. As a result, identifying respondents with in-depth knowledge of SMI and its implementation was difficult. Since many of our questions pertained to events that occurred several years ago, respondents' recollection of these experiences may, at times, be limited or imprecise. Nevertheless, we believe that, despite these challenges, the quality of the data collected is strong.

<u>Retrospective inquiry and treatment bias</u>. When asking questions relying on respondents' memory about what happened, when, where, why and in what order, the information collected is a source of at least six types of biases. First, current goals and beliefs affect the recollection of memories so that individuals tend to look for a "strong" story as sense-making beings. Perceptions about treatment and its impact may be overestimated and random or alternative theories underestimated them. Respondents also tend to forget pieces of evidence, have limited attention span for questions, suffer from involuntary temporary or permanent mental blocks, attribute memories to incorrect sources, and may be subjective in their recollection of unwanted memories they cannot forget.[10] Therefore, qualitative findings collected through recollection fieldwork should be interpreted carefully, particularly when it comes to the size of treatment effects. To address these biases, NORC relied on a diverse sample of respondents with contrasting perspectives and uses of SMI. The evaluation also incorporated time anchors or landmarks in the data collection instruments to help respondents locate the right facts and events in time. Fieldwork professionals were trained to ask challenging questions to reduce the "strong-story" or confirmation bias that making sense of the treatment effects sometimes causes in retrospective inquiry.

<u>CMO configuration and theories of change</u>. NORC used a CMO configuration[11] approach to understand, in more detail, the contributions that SMI´s technical assistance strategies made to the intended outcomes. Specifically, NORC used this approach to examine mechanisms implemented by SMI to impact the antenatal care (ANC) lifecycle in Honduras and the delivery cycle in Belize. Considering the CMO configuration is a theory-based approach, it uses detailed theories of change and program logic to map out the processes of change that take place when an intervention is implemented in a certain institutional or social context. In the case of SMI, NORC confirmed that the Initiative's theory of change explains changes at a systemic level rather than at the intervention unit at a certain hospital, community, or local health center (LCH). For this reason, NORC used program information collected from formative interviews with SMI's technical team and from fieldwork to build simplified program logics that are reflected in Annexes 6.1 and 6.2, and summarized in Figures 4 and 6. Theories and change pathways used

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[10] Neusar, A. (2014). To trust or not to trust? Interpretations in qualitative research. Human Affairs, 24(2), 178-188. https://doi.org/10.2478/s13374-014-0218-9

[11] A Context-Mechanism-Outcome (CMO) configuration is an analytical approach used in Emergent Realist Evaluation (ERE) to identify mechanisms of change in the context in which social actors make decisions and these processes take place. The configuration is helpful to separate elements of program implementation from the mechanisms (M), which occur independently of the interventions. It also allows researchers to identify contextual elements (C) separately and assess their impact on the mechanisms and the outcomes of implementation (O), either intended or unintended. In the case of maternal and child healthcare, the institutional processes at first and second levels of healthcare, while theoretically independent from any external intervention, can be subject of influence from any new treatment or strategy implemented in the same context in which these mechanisms take place.

by the technical team and in-country actors during the implementation of the SMI interventions, were neither documented nor available to NORC on a written basis.

III. Findings

The findings of the evaluation are presented as follows: Section 3.1 focuses on maternal, neonatal, and child health (MNCH) outcomes, using both quantitative and qualitative data, and examines the impact of the COVID-19 pandemic on SMI's operations. Section 3.2 provides an analysis of different SMI components and their effects on MNCH objectives. In Section 3.3, we discuss the role of the IDB in coordinating and supporting SMI implementation across countries. Finally, we assess the sustainability of SMI interventions in Section 3.4.

3.1. SMI effect on MNCH outcomes

In this section we focus on the effects of the SMI intervention on multiple outcomes over the life cycle. We start with pregnancy care which includes antenatal care coverage and quality.

Pregnancy

An adequate number of antenatal care (ANC) visits, initiated early in pregnancy, is essential for maternal and fetal health. The quality of care provided during these visits is critical in preventing serious complications for both mothers and their babies. In household surveys, women that gave birth in the previous five years were asked how many times they visited health facilities for antenatal care, when the first visit was conducted, and what types of exams were conducted during the visits, among other questions. Figure 3 summarizes results for three indicators: i) The percent of women that had at least four ANC visits; ii) the percent of women whose first ANC was during the first 12 weeks of their pregnancy, and iii) the percent of women that that received ANC with quality. ANC with quality is defined as the completion of essential laboratory tests (urine and blood tests) along with key clinical measurements, including the woman's weight, blood pressure, fundal height, and the fetal heartbeat. The quality indicator is a binary variable, where a value of 1 indicates that all required tests and measurements were conducted, and 0 indicates otherwise. This indicator is calculated only for women that attended at least one ANC visit.

Figure 3, Panel A shows results for the seven countries for which household surveys were conducted, namely Belize, Guatemala, Honduras, Nicaragua, Chiapas (Mexico), Panama and El Salvador. All three indicators had relatively small improvements between baseline and operation 2, being the largest for ANC with Quality; at baseline 66 percent of women received ANC with quality while this figure at operation 2 was 76 percent, for a 10 percentage points increase. Panel B shows results for the four countries where operation 3 was conducted (Belize, Honduras, Nicaragua, and El Salvador). Between baseline and operation 3 there were improvements for ANC with quality and the percentage of women that had their first ANC visit during the first 12 weeks of pregnancy, and a small decline in the percent of women that had at

least four ANC visits. Operation 3 data was collected in the second half of 2022, and the indicator considers the two prior years, which included part of 2020 when the COVID-19 pandemic started; this could explain why women had fewer ANC visits, albeit the quality of the conducted visits improved.

Figure 3. Ante-natal care in SMI areas

A. Pooled results for Belize, Guatemala, Honduras, Nicaragua, Chiapas (Mexico), Panama and El Salvador
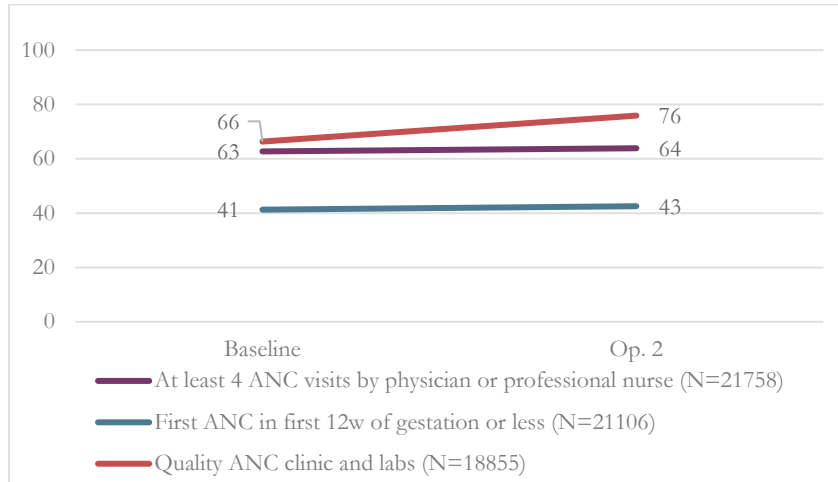
B. Pooled results for Belize, Honduras, Nicaragua, and El Salvador
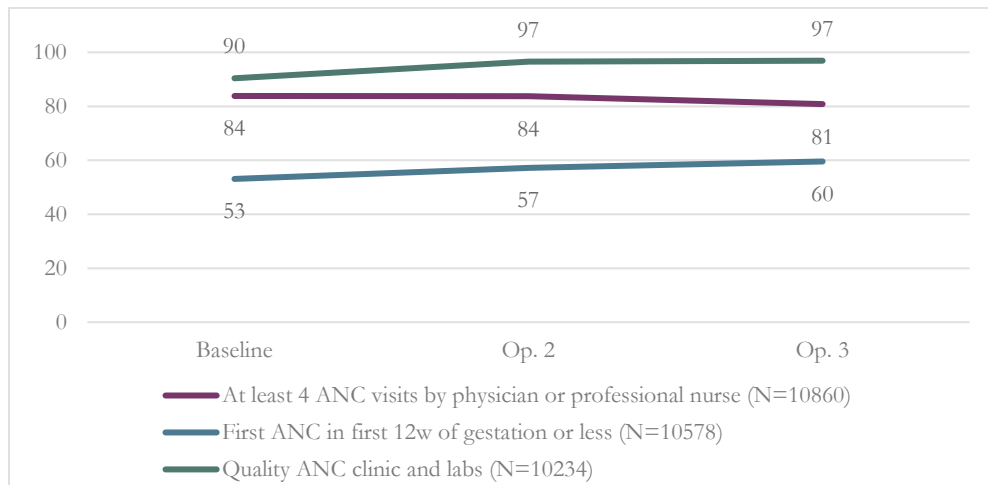
Note: Household data. Results correspond to the average of each (unweighted) country-specific mean. Ante-natal care with quality defined as a binary indicator for having conducted lab tests (urine and blood) and clinical tests (measurements of blood pressure, weight, fundal pressure and fetus heartbeat). ANC with quality is calculated for women that had at least once ante-natal care visit. Belize data are available for the indicator on at least 4 visits only.

Table 4 presents the impact evaluation results for antenatal outcomes. The first four columns show results from each of the four impact evaluation countries. For Guatemala and Chiapas, only the impacts from operation 2 are estimated, while for Honduras and Nicaragua, for which

we also have operation 3 data, impacts are estimated for both baseline-operations 2 and baseline – operations 3. The fifth column combines data from all four countries but restricts the analysis to the baseline and operation 2 periods, even for Honduras and Nicaragua. Column (6) focuses solely on Honduras and Nicaragua, estimating the impacts for both operations 2 and 3.

The key findings are as follows:

- Panel A shows regression results where the dependent variable is binary, equal to 1 if the respondent had at least four ANC visits with a physician or professional nurse, and 0 otherwise. We find a positive impact for Guatemala only. The results indicate that in SMI areas women were 12 percentage points more likely to have had at least four ANC visits with a physician or professional nurse.

- Panel B reports results for a binary variable indicating whether the respondent's first ANC visit occurred within the first 12 weeks of gestation (1 if yes, 0 otherwise). In this case, positive impacts were observed for Guatemala and Honduras. In Guatemala, women in SMI areas were 8 percentage points more likely to have had their first ANC visit during the first 12 weeks of gestation than women in comparison areas, with this impact observed during operation 2—the only follow-up conducted in the country. In Honduras, a 10-percentage-point impact was observed during operation 2, though no impact was found during operation 3. The impact in operation 2 for Honduras explains that, when this country and Nicaragua are pooled, in column (6), there is also a statistically significant impact of 6 percentage points.

- Panel C shows results for ANC with quality. In this case there is a positive impact for Chiapas (Mexico) of 14 percentage points, which is high enough for the pooled regression in column (5) to show a statistically significant impact of 6 percentage points.

Table 4. Impact of SMI – Ante-natal care outcomes (percentage points)

	Guatemala	Honduras	Mexico	Nicaragua	All-Op.2	Honduras and Nicaragua Op. 2&3
	(1)	(2)	(3)	(4)	(5)	(6)
A. At least 4 ANC visits by physician or professional nurse						
Op. 2 impact	0.12*	0.02	0.09	-0.04	0.06	-0.01
	(0.04)	(0.03)	(0.07)	(0.08)	(0.03)	(0.04)
Op. 3 impact		0.08		-0.08		-0.00
		(0.04)		(0.05)		(0.04)
N	7496	6027	7968	5934	24382	11961
Mean at Bl	0.12	0.69	0.53	0.79	0.43	0.74
B. First ANC in first 12w of gestation or less						
Op. 2 impact	0.08*	0.10***	0.01	0.01	0.04	0.06*
	(0.03)	(0.02)	(0.04)	(0.04)	(0.02)	(0.03)
Op. 3 impact		0.06		-0.07		-0.00
		(0.08)		(0.04)		(0.05)
N	7239	5952	7865	5882	23913	11834
Mean at Bl	0.20	0.49	0.37	0.44	0.33	0.47

	Guatemala	Honduras	Mexico	Nicaragua	All-Op.2	Honduras and Nicaragua Op. 2&3
	(1)	(2)	(3)	(4)	(5)	(6)
C. Quality ANC clinic and labs						
Op. 2	-0.01	0.03	0.14*	0.01	0.06*	0.03
impact	(0.06)	(0.03)	(0.06)	(0.02)	(0.03)	(0.02)
Op. 3		0.03		-0.00		0.01
impact		(0.02)		(0.02)		(0.01)
N	6003	5768	7225	5569	21676	11337
Mean at BI	0.11	0.89	0.32	0.89	0.40	0.89

Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. Household data. ANC with quality is defined as a binary indicator for having conducted lab tests (urine and blood) and clinical tests (measurements of blood pressure, weight, fundal pressure and fetus heartbeat). ANC with quality indicator defined only for women that had at least once antenatal care visit.

Standard errors in parentheses. Standard errors are clustered at the *Gestor* level for Honduras and the municipality level for the other three countries.

* p<0.05 ** p<0.01 *** p<0.001

As mentioned in the Methodology section, in Chiapas and Nicaragua some comparison areas were partially treated. In Annex 3 we show results excluding contaminated municipalities. The results are similar to those shown in Table 4, except for the "at least four ANC visits" indicator. While the results Table 4 are not statistically significant, when comparison municipalities are excluded, the results are positive and statistically significant for both Chiapas (18 percentage points) and Nicaragua (12 percentage points). This suggests that the contaminated municipalities benefited from being part of a treated higher level facility network, enough to dilute the treatment effect when they are included as part of the comparison group in the regression. It is not clear what mechanisms could be responsible for this benefit.

Also, since the data spans five years, it is possible that some of the SMI impacts attributed to Operation 2 are attenuated, as the program likely had smaller effects during its early years of implementation compared to later periods. Table 5 shows that, from baseline to the end of Operation 3, SMI locations in Honduras with available qualitative data saw increases in: (1) proportion of pregnant women with at least four ANC visits with a physician or professional nurse, (2) the proportion of pregnant women with the first ANC visit within the 12 first weeks, and (3) the percentage of ANC visits with clinic and lab managed by medical staff following established norms. While the proportion in (1) and (2) reduced in El Salvador by 10 percentage points and one percentage points in the same period, respectively, the proportion in (3) also increased. In Belize, the proportion of pregnant women who completed at least 4 ANC visits

with a physician or a certified nurse increased to 100 percent by the end of operation 2 but suffered a reduction of almost 12 percentage points between baseline and operation 3.

Table 5. Progress in SMI areas – ANC – Countries selected for qualitative data collection

	At least 4 ANC visits to physician or professional nurse			First ANC in first 12w of gestation or less			Quality ANC clinic and labs		
	Bl	Op.2	Op.3	Bl	Op.2	Op.3	Bl	Op.2	Op.3
Belize	96.4	100.0	84.5	--	--	--	--	--	--
Honduras	71.8	80.9	90.0	50.4	62.5	63.9	89.4	96.7	98.6
El Salvador	90.0	88.3	79.2	64.3	61.7	62.6	92.2	98.7	97.9

Note: Household data. Ante-natal care with quality is defined as a binary indicator for having conducted lab tests (urine and blood) and clinical tests (measurements of blood pressure, weight, fundal pressure and fetus heartbeat). Indicator defined only for women that had at least once ante-natal care visit.

NORC collected qualitative data from national and local health departments (LHD), health centers staff, CHWs, midwives, and mothers and their relatives and explored the interactions these actors had with SMI interventions targeting ANC. In examining ANC visits among pregnant women and the care quality, commonalities and differences emerge among Belize, El Salvador, and Honduras, particularly around the role of CHWs, cultural and social barriers, and health system resources. We present our findings below.

Clinical Control Form (*Hoja Filtro*). - The *hoja filtro* is a monitoring tool initially adopted by a local health center (LHC) in El Salvador and then incorporated by all SMI countries to track the reproductive health of women aged 10 to 49. During visits to high-performing health facilities, the SMI team and the Ministry of Health (MoH) discovered its use in one of these facilities and decided to adopt it. CHWs found it useful to identify pregnancies early (before 12 weeks) and monitoring ANC attendance in El Salvador and Honduras. Table 5 shows that ANC visits in the first 12 weeks of pregnancy increased in Honduras and stayed stable in El Salvador. This tool also served CHWs and LHCs to schedule home visits and manage family planning and prenatal services. In some communities, the tool faced resistance due to additional paperwork. However, with proper training, it became essential for early pregnancy detection and increased ANC visits in most surveyed SMI communities, according to CHWs and health staff.

Most surveyed health workers found the *hoja filtro* improved care quality by helping LHCs meet ANC targets. The tool enabled healthcare workers, including CHWs and midwives, to effectively guide women through all prenatal check-ups by standardizing record-keeping and improving early intervention. Despite its success, some limitations arose due to self-reported information inaccuracies, likely influenced by cultural barriers and shame about pregnancies due to social pressure in small communities. A comment from a LHC worker in Belize explained the former: *"Cultural barriers make them prefer keeping their pregnancies in secret, so that they should not go to the local health centers until they have four months".* In addition, CHWs explained that some women might provide inaccurate information about their menstrual cycle, contraceptive use, or sexual activity, due to embarrassment or because they feared judgment. *"I can say it's*

60 percent effective. Due to local culture and different values, sometimes women lie about the information we ask them, including whether they are pregnant."

CHW and Midwife Community Visits. – Community visits in rural areas, such as those conducted by CHWs and midwives, played a critical role in encouraging ANC visits among pregnant women. In Belize, El Salvador, and Honduras, CHWs visited homes to promote early ANC appointments, educate on prenatal care, and distribute prenatal health resources like vitamins and supplements. These visits also helped build trust with vulnerable groups, particularly adolescent girls. In Honduras, LHD staff explained that a woman missing a prenatal check-up appointment would trigger a CHW home visit. As an LHD respondent explained:

> *"If the woman does not make it to her ANC appointment, she is paid a home visit. Then, we give her other supplies, vitamins (folic acid) with her antenatal control card so that she can do her antenatal check-ups, be aware of her appointments to attend antenatal check-ups and also the pregnant club meetings."*

In Belize, some CHWs left their phone numbers with women of childbearing age in case they had questions. LHC respondents reported that nurses also telephoned pregnant women of whom they had phone records to remind them to attend first check-ups. In cases where this was not possible, nurses would occasionally go to their houses.

As part of these visits, CHWs organized Pregnant Women Clubs in SMI communities in El Salvador and Honduras. These clubs encouraged pregnant women to attend ANC appointments, emphasizing early visits in the first trimester and regular follow-ups throughout pregnancy. CHWs played a central role by conducting home visits, providing health information, and delivering services like free ultrasounds and diagnostic tests, which some respondents reported were otherwise costly. Through educational sessions and support networks derived from these clubs, pregnant women received frequent care, helping to reduce social barriers, ensure early detection of potential health issues, and improve MCHC outcomes.

Additionally, local health staff across SMI communities also described monthly informational AIN-C (*Atención Integral a la Niñez en la Comunidad*) meetings, which reportedly convened mothers with children under two years to explain the risks of anomalies during pregnancies and promote ANC services. The monthly meetings were also spaces for early identification of pregnant women. Additionally, CHWs considered community-wide talks to be especially useful in fighting social prejudice against geriatric or unplanned pregnancies; changes in social perceptions helped CHWs identify pregnancies that women may otherwise try to hide due to social stigma.

Challenges impacting community-based ANC efforts include safety concerns, such as gang violence in certain regions of El Salvador and Honduras. Respondents also identified CHWs shortages and low financial incentives to CHW as obstacles to carry out continuous community visits and follow up on pregnant women. A few LHC respondents reported women's concerns about local volunteers working as CHWs; volunteer personal relationships with pregnant women and other members of the community threatened, in the eyes of pregnant women, their privacy.

One LHC in Honduras shifted strategies by assigning rapid test applications to paid CHWs and medical staff instead of using volunteer facilitators, because:

> *"In general, volunteers are very cooperative, right? But due to the fact that volunteers are well known in the community, then those patients who knew the volunteer CHW, they would not want to interact with them; they may have felt ashamed. We ended up discarding volunteering CHWs and replaced with health promoter, physician or nurse visits to the communities."*

Despite these obstacles, LHCs have noted improvements in ANC quality through increased training, better equipment, and the strategic coordination of health networks. These efforts support the recommended number of ANC visits and timely pregnancy care, both of which have increased in Honduras, as shown by the quantitative data in Table 5. For Belize, we only have data for the "At least 4 ANC visits to physician or professional nurse" indicator. The indicator shows a decline in the percentage of women that complied with the number of visits by the end of operation 3, however, as we mentioned in the Limitations Section, the education of women surveyed at that time was lower than the education of women at baseline and may explain the reported decrease.

Supply of Equipment, Rapid Tests and Supplements. – Household surveys suggest an increase in the percentage of women that received ANC with quality in El Salvador and Honduras (see Table 5). According to LHC staff and CHWs, LHCs in SMI areas upgraded ANC equipment, streamlined ANC processes, and increased staff training and strategic CHW involvement. Some health centers received rapid pregnancy tests, rapid glucose and hemoglobin tests and comfortable furniture for patient intake, facilitating a more welcoming environment. In all three countries, health centers reported their staff received competency training on the use of rapid tests according to the norms that had been recently modified. Additionally, they were trained on monitoring pregnant women, identifying sickle cells, and learning about maternal weight implications. Overall, they attributed these skills as vital to improve the quality of the ANC provided.

However, LHCs respondents also faced barriers, including supply issues, such as prolonged procurement delays in El Salvador that led to test shortages. Community resistance, often due to social stigma around unplanned pregnancies, limited test use among women. In a few cases, women and community members reported ANC lab services were not free at LHCs and high costs for lab tests prevented women in some communities to attend LHCs. In Honduras, the most common challenges to providing continuous care at local health centers (LHCs) included a shortage of human resources—particularly community health workers (CHWs) to administer tests—high CHW turnover, community resistance, and low financial incentives for CHWs. One LHC staff member noted that, even before the COVID-19 pandemic, they needed more CHWs. While they had received the necessary equipment and supplies, meeting their targets was impossible without sufficient personnel.

Enhanced coordination between first and second levels of assistance. – CHWs highlighted the importance of collaboration between hospital and community teams to ensure women received high-quality and timely ANC (see Table 5). These coordinated efforts significantly improved both

service quality and coverage. In Honduras, over 98 percent of pregnant women received ANC with enhanced quality likely due to improved coordination within healthcare networks, upgraded laboratory equipment, and training in diagnostic tests, including early ultrasounds (before 20 weeks). Improved communication tools, such as activating phone lines and assigning staff to manage them, facilitated appointment scheduling and follow-up. One hospital staff member in Honduras noted, *"there are considerably more communication resources to facilitate the ANC visits than before. Technology has benefited us; the system is more open to users now."*

SMI implemented various interventions in Honduras to encourage earlier ANC initiation (Outcome A); increase the proportion of pregnant women attending ANC appointments (Outcome B); increase institutional deliveries (Outcome C); and improve the quality of care through comprehensive measurements, tests, and lab procedures (Outcome D). To better understand how these interventions influenced pregnant women's preparation for delivery and the ANC system itself, we gathered additional data through interviews with LHC staff, CHWs, midwives, and women of reproductive age and their families in SMI communities. The evaluation team then analyzed this data using the "Context-Mechanism-Outcome Configuration" (CMO) approach. This technique breaks the ANC mechanisms into the resource mechanism – or treatment uptake – and the reasoning mechanism that social actors make about the treatment they receive, which mediates their decision to use any of the treatment – i.e., acquired skills, information, equipment, etc. The surrounding institutional and social context moderates the adoption of treatment.

Table 6 summarizes mechanisms connecting SMI intervention components (Intervention Component, in column 1) with the mechanisms that CHW and LHC staff, as well as pregnant women intrinsically follow, always embedded in their community and institutional context (Context, in column 3). The interaction between intervention and context, results in the extent of use of the intervention elements (Use, in column 5). Use, in turn leads to intended outcomes (column 6), through the users' uptake (Uptake, in column 2) and reasoning of the treatment (Reasoning, in column 4). More details about the CMO analysis and its contributions to the intended outcomes can be found in Annex 6.

Table 6. Factors Associated to ANC Outcomes – Honduras

| Intervention Component | Context[1] | Mechanism | | Use[4] | BL – Operation 3 Outcome(s)[5] |
		Resources[2]	Reasoning[3]		
CMW incentives for early detection	Favorable w/ caveats	Effective	Valued	Partially adopted	A: 50.4 → 63.9%
Early detection using diagnosis form (hoja filtro) for pregnant women	Favorable w/ caveats	Effective	Valued	Partially adopted	A: 50.4 → 63.9% B: 71.8 → 90%
Regular pregnant Women Clubs (*Club de Embarazadas*)	Favorable	Effective	Valued	Adopted as planned	B: 71.8 → 90%
Onsite ANC module (some communities)	Favorable w/ caveats	Effective	Valued	Adopted as planned	B: 71.8 → 90%
Promotion & planning (community visits)	Favorable w/ caveats	Effective	Valued	Partially adopted	B: 71.8→ 90%

Intervention Component	Context[1]	Mechanism		Use[4]	BL – Operation 3 Outcome(s)[5]
		Resources[2]	Reasoning[3]		
Volunteers, CHW, LHC staff training	Favorable	Effective	Valued	Adopted as planned	C: 89.4 → 98.6%
Supply of rapid tests & supplements	Favorable	Partial	Valued	Partially adopted	C: 89.4 → 98.6%

Notes: Additional details on the CMO configuration approach and the information collected in the field to establish these contribution paths can be found in Annex 6. (1) The scale for context role in moderating the use of interventions has three levels: favorable, favorable with caveats, and obstacle. (2) The uptake of intervention resources by participants is measured in a three-level scale, including effective uptake, partial uptake, or absent uptake. For cases in which the evaluation obtained no or scarce evidence of uptake, the table displays a "small evidence" legend. (3) The reasoning mechanisms of participants is captured in three levels: the intervention elements were acknowledged and valued, only acknowledged, or irrelevant. According to the program logic, if participants do not acknowledge and value the newly acquired skill or equipment, the intervention's contribution to use and outcome change is reduced or unlikely. (4) Use of newly acquired skill or equipment is measured in the table in three levels: adopted as planned, partially adopted, and not adopted. (5) Outcome A: % of pregnant women with first ANC within first 12w of gestation. Outcome B: % pregnant women with at least 4 ANC visits to physician or professional nurse. Outcome C: % of ANC clinic and lab tests with quality according to technical norms. See Table 5 to see ANC outcomes for all 3 qualitative data collection countries.

As indicated in the first row of Table 6, SMI provided financial incentives to CHW for early detection of pregnant women. However, this was only partially appropriate/favorable given the local context. Volunteer CHWs received minimal financial incentives, and some pregnant women were hesitant to engage due to fears of social stigma, as the volunteers often knew the WRA´s social networks personally. While SMI made the CHW incentives available, in some communities the social context and the opportunity cost associated with low stipends limited the contribution of these incentives to promote early ANC visits.

The *hoja filtro*, on the second row, emerged as a highly effective tool for early pregnancy detection and monitoring pregnant women throughout their ANC visits. Respondents reported comprehensive training in its use and strong appreciation for the tool among CHWs in SMI communities. However, the community context presented some challenges to achieve accurate results for early pregnancy detection. Many women either lacked precise information about their last menstruation or pregnancies or, in some cases, were reluctant to share this information due to concerns about social scrutiny. This reluctance limited the tool's full impact on early detection rates and on encouraging additional pregnant women to do at least four ANC visits.

In addition to using the diagnosis form, Figure 4 outlines other three SMI interventions aimed to increase the proportion of women with at least four ANC visits: regular pregnant women clubs (row 3), onsite ANC modules (row 4), and community visits (row 5). While respondents reported the training SMI-provided and staff placed high value on all three activities, only the pregnant women's clubs benefited from a favorable implementation context to promote its use and impact. In contrast, the deployment of onsite ANC modules and the community visits encountered resistance in some communities. These challenges stemmed from cultural values that conflicted with delivering at the hospital and concerns about social judgment, particularly for unmarried pregnant women or those with absent partners. Despite this less favorable context, the proportion of women with at least 4 ANC visits rose from 71.8 at baseline, to 90 percent at the end of operation 3 in Honduras (Table 5).

Finally, respondents agreed that both training CHWs and LHC staff on the use of rapid tests (row 7), along with providing these tests and supplements locally (row 8), contributed to the increase in the proportion of women that received ANC with quality. According to the household surveys in Honduras, this proportion rose from 89.4 percent to 98.6 percent (Table 5). Both interventions benefited from a favorable community and institutional context, though the uptake and use of supplies was partial due to occasional shortages of materials and insufficient staff to administer the tests.

In summary, SMI intervention elements to impact the pregnancy life cycle positively contributed to the intended outcomes between baseline and operation 3 in Honduras at varied degrees. First, an increase in the proportion of pregnant women with the first ANC within first 12 weeks of gestation from 50.4 to 63.9 percent found partial contribution from providing CHW incentives for early detection and using the diagnosis form (*hoja filtro*); while the delivery and administration were successful, the community context for a fraction of pregnant women was not favorable to obtain accurate information about menstrual periods and led to failures in detecting a fraction of early pregnancies consistently. Also, the costs associated with pursuing the ANC visits exceeded the benefits of receiving a stipend for most volunteer CHWs. Second, the proportion of pregnant women with at least 4 ANC visits to physician or professional nurse, which increased from 71.8 to 90 percent also registered some positive influence from using the diagnosis form (*hoja filtro*) at the community level and from the ANC promotion & planning activities during community visits, with more obstacles in communities and households that were still resistant or had reservations to ANC and institutional delivery services due to religious and moral beliefs to prefer traditional delivery at home and alternative healing. However, this outcome was positively influenced by the regular Pregnant Women Clubs and the onsite ANC modules where those were implemented; both strategies were implemented in favorable contexts and highly valued by WRA. Third, the small increase in ANC clinic and lab tests with quality from 89.4 to 98.6 found positive contributions from the training on rapid tests to community volunteers, CHWs, and LHC staff, who valued the acquired skills and the role they became able to play in their community. This contribution had some caveats related to temporary suspension in supplies during both operations.

Delivery

Figure 4 summarizes findings for three delivery indicators in SMI locations: i) The proportion of women whose deliveries were conducted in health facilities with skilled attendant (medical doctor and/or a professional nurse); ii) The proportion of women with obstetric complications (such as sepsis, hemorrhage, severe pre-eclampsia, and eclampsia) who received norm-compliant treatment; and iii) The proportion of women who received quality delivery care, marked by the administration of an uterotonic following birth. The data source of the first indicator is the household survey, and for the other two indicators the health facilities survey, and cover deliveries that occurred in the past five or two years respectively. Together, these indicators provide an overview of maternal health service utilization and quality of care during delivery in the SMI locations. As before, Panel A shows results for the seven countries where both surveys were conducted for baseline and operation 2. Panel B shows results for the four

countries where operation 3 was conducted.[12] Both Panels showed notable improvements over time.

Figure 4. Delivery Outcomes in SMI locations

A. Pooled results for Belize, Guatemala, Honduras, Nicaragua, Chiapas (Mexico), Panama and El Salvador
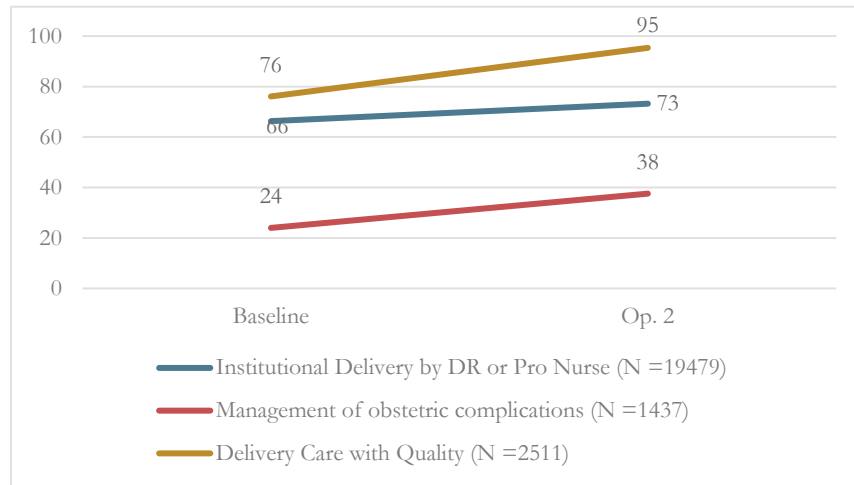
B. Pooled results for Belize, Honduras, Nicaragua, and El Salvador
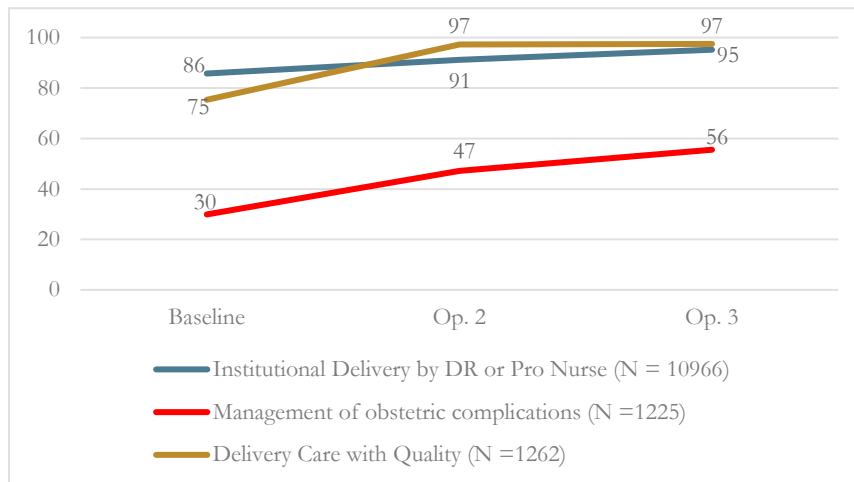
Note: Results correspond to the average of each (unweighted) country-specific mean. El Salvador data are available for the indicator on Institutional Delivery by a Doctor or Professional Nurse only. Panama data are not available for the indicator on Management of obstetric complications.

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[12] Due to data availability constraints, information on the management of obstetric complications was not collected in El Salvador at baseline or during the three rounds in Panama. Information on the institutional delivery by doctor or professional nurse was also not captured across the three rounds in Panama. Additionally, baseline data for the quality of delivery care indicator were not available for El Salvador. As a result, these countries were excluded from the pooled results for these specific indicators.

Table 6 presents the impact evaluation results for delivery outcomes, following the same structure as in Table 4. The dependent variable for each set of regressions is the respective indicator for each of the delivery outcomes introduced above. The key findings are as follows:

- Panel A reports results for institutional delivery assisted by a doctor or professional nurse (1 if yes, 0 otherwise), with no statistically significant impact detected in any specifications.
- Panel B presents results for the management of obstetric complications. Positive impacts were noted in Mexico, where women with obstetric complications in the SMI areas were 28 percentage points more likely to receive care that adhered to established medical norms than those in comparison areas, with this impact observed during operation 2, the only follow-up conducted in the country. The point estimates for Honduras are positive and relatively large for both operations 2 and 3, although not statistically significant.
- Panel C shows results for delivery care with quality. In operation 2, Nicaragua saw a negative impact of -12 percentage points. Note that the mean at baseline was very high, and this negative coefficient reflects comparison areas catching up. For operation 3, Honduras observed significant positive impact of 7 percentage points, suggesting an improvement in the administration of uterotonics in SMI sites compared to control areas.

Table 7. Impact of SMI – Delivery outcomes (percentage points)

	Guatemala	Honduras	Mexico	Nicaragua	All-Op.2	Honduras and Nicaragua Op. 2&3
	(1)	(2)	(3)	(4)	(5)	(6)
A. Institutional Delivery by DR or Pro Nurse						
Op. 2	0.09	0.06	0.00	-0.03	0.04	0.02
impact	(0.05)	(0.04)	(0.07)	(0.03)	(0.03)	(0.03)
Op. 3		0.11		-0.04		0.03
impact		(0.05)		(0.02)		(0.04)
N	7548	5967	8012	5960	24435	11927
Mean at Bl	0.18	0.71	0.37	0.87	0.40	0.79
B. Management of obstetric complications						
Op. 2	0.03	0.11	0.28**	0.04	0.07	0.03
impact	(0.07)	(0.12)	(0.08)	(0.15)	(0.07)	(0.09)
Op. 3		0.12		0.22		0.15
impact		(0.12)		(0.15)		(0.09)
N	302	586	351	938	1723	1524
Mean at Bl	0.16	0.29	0.20	0.30	0.25	0.29
C. Delivery Care with Quality						
Op. 2	0.15	0.03	-0.04	-0.12**	-0.00	-0.00
impact	(0.08)	(0.02)	(0.12)	(0.04)	(0.06)	(0.03)
Op. 3		0.07*		-0.07		0.05
impact		(0.03)		(0.04)		(0.03)
N	892	884	670	666	2857	1550
Mean at Bl	0.84	0.97	0.68	0.96	0.85	0.97

Notes: (1) Institutional Delivery by a doctor or professional nurse (HH data): Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. (2) Management of obstetric complications (HF data): Linear probability

models controlling for mother's characteristics (i.e., age group, literacy, and marital status), complication type, and facility fixed effects. For regressions that include data from operation 3 (columns 6-8) we do not include facility fixed effects because facility identifiers were not available for the that operation. Instead, we included a treatment indicator. (3) Delivery Care with Quality (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status) and health facility classification

Standard errors in parentheses. HH data: Standard errors are clustered at the *Gestor* level for Honduras and the municipality level for the other three countries. HF data: Standard errors are clustered at the facility level for regressions that do not include operation 3, and the facility-year level for regressions that include operation 3.
* p<0.05 ** p<0.01 *** p<0.001

Results excluding contaminated municipalities in Chiapas and Nicaragua, shown in Annex 3, are very similar to those shown in Table 6.

Table 7 shows that, from baseline to the end of Operation 3, SMI locations in the three countries with available qualitative data saw increases in: (1) institutional deliveries attended by doctors or professional nurses, (2) the proportion of deliveries performed according to quality standards, and (3) the percentage of complications managed by medical staff following established norms. While there is no baseline data for delivery care with quality and management of obstetric complications for Belize, El Salvador, and Honduras also showed improvements between baseline and operation for these 2 indicators.

Table 8. Progress in SMI areas – Delivery outcomes

	Institutional Delivery by DR or Pro Nurse			Management of obstetric complications			Delivery Care with Quality		
	BI	Op. 2	Op. 3	BI	Op. 2	Op. 3	BI	Op. 2	Op. 3
Belize	0.98	0.97	1.00	0.22	0.34	0.56	0.34	0.99	0.95
Honduras	0.77	0.89	0.94	0.36	0.63	0.65	0.95	0.99	1.00
El Salvador	0.87	0.98	0.97	--	0.05	0.14	--	0.95	0.99

Note: Institutional delivery data from household survey. Management of obstetric complications assesses whether women with obstetric complications (sepsis, hemorrhage, severe pre-eclampsia and eclampsia) were treated according to the norm, as reported in health facility surveys. Delivery care with quality was measured by the active management of the third stage of labor, also based on health facility surveys. The indicator specifically tracks whether women were administered oxytocin or another uterotonic following birth.

Qualitative data collected by NORC explores the experience of different respondents with SMI interventions targeting this life cycle. We present our findings below.

Training on New Delivery Guidelines and Obstetric Standards. Training on protocols and guidelines under SMI positively influenced maternal and child healthcare across Belize and Honduras. An increase in training for hospital staff and midwives on managing obstetric complications, such as postpartum hemorrhaging and preeclampsia, and the presence of specialized staff, such as pediatricians and gynecologists, allowed for early complication detection and an increase in complications management according to norms. Table 7 shows that the proportion of complications managed by medical staff according to norms increased more than 30 percentage points in both countries after training, protocol updates, and incentives for institutional deliveries.

Hospitals in Honduras SMI areas introduced new practices, like visiting the patient within thirty minutes after childbirth to prevent complications. A staff member noted that the presence of a

pediatrician and an obstetrician in the maternity room helped monitor delivery complications effectively at an earlier stage of labor. Obstetric staff appreciated the guidebooks and informational charts provided during SMI. Guidelines and obstetric standards that the MoH adjusted with the support of SMI were mandatory countrywide but staff at non-SMI hospitals reported that they could not always follow these policies. For instance, hospital staff in Comayagua, a non-SMI facility, noted that while institutional births had increased and staff took care of cases involving hemorrhages, hospital staff would not always follow official guidelines because the pharmaceutical provisions in those guidelines were not available in that hospital.

In El Salvador, while adherence to updated protocols raised delivery care quality in the pre-pandemic period, most respondents in both SMI and non-SMI areas agreed that the adoption of the "Born with Love Act" (*Ley Nacer con Cariño*) – a law approved by the Salvadorian Assembly – became the main driving force to address quality of delivery care since 2021. The act emphasized more humane delivery practices and culturally sensitive care, supported by continuous training on resuscitation and neonatal transfers. According to hospital staff in Santiago, since the new law came into effect, the Ministry of Health (Minsal) created new guidelines aimed to improve births in hospitals, such as the creation of maternal waiting areas for mothers to wait for natural births deliveries.

Delivery planning and awareness of complications during community visits. As part of the community visits, CHWs and midwives, particularly in Belize and Honduras, worked with women and their relatives to raise their awareness about potential complications during birth and the convenience of preventing those by delivering their babies at the hospital. In Honduras, where the proportion of institutional deliveries increased from 77 to 94 percent (see Table 7), women and their partners described how the decision to give birth in a local health center or hospital was driven by specific medical conditions or complications during pregnancy that required more advanced care, such as cesarean sections or treatment for anemia. In some SMI areas, surveyed women's partners and family members highlighted the availability of medications and vaccines as an essential criterion for the family to choose an institutional birth.

The role of midwives changed during the period of SMI intervention, both in SMI and non-SMI areas, from actors who assisted pregnant women during labor in the community to educators who provide guidance and advice to women and their partners and relatives to use hospital services. This comment from a CHW in a non-SMI community in Honduras describes this change:

> *"The change is on the midwife's approach because she used to act as a doctor in the community, she came to assist births and now her approach is educational, so that they guide the patient and refer her to the maternal ward here. And that's in their favor. It is not focused on them assisting births in the community, but on monitoring pregnant women, accompanying them to the hospital."*

In Honduras, CHWs described two strategies that influenced the increase of institutional deliveries and facilitated managing potential complications. First, a highly effective strategy was to provide transportation and logistical support to pregnant women so they could deliver their babies at a hospital. While the uptake of this intervention was partial because CHWs and

midwives reported limited resources, in cases where the support was provided, it was very well received and led to effective use and increase in institutional deliveries, up from 77 to 94 percent between baseline and Operation 3, as shown in Table 7 above. Second, CHW said that creating monthly lists of expecting mothers who were asked to deliver at the regional hospital was a highly effective strategy for the same outcome. Once the expecting mothers agreed, the CHWs would arrange car transportation and inform the mothers of the pickup schedule in advance. Health promoters would then arrange accommodations for the expecting mothers at a temporary maternal home near the hospital. One maternal home in Santa Rosa de Copan, for instance, had the capacity to host up to 11 women at a time.

Training on active management of the third stage of labor (AMTSL). AMTSL is an approach to prevent postpartum hemorrhage (PPH) by facilitating the expulsion of the placenta and minimizing blood loss. It involves the administration of uterotonic agents, usually oxytocin, immediately after childbirth, to prevent excessive bleeding, while a nurse monitors and manages this phase meticulously. As illustrated in this comment from a hospital health professional in Honduras:

> *"During delivery, the active management of the third period is a tool we can still assess and was strengthened during Salud Mesoamerica; it reduced the impact of postpartum complications such as postpartum hemorrhage."*

In Belize, El Salvador and Honduras, the adoption of AMTSL practices translated into significant improvements in delivery care. For instance, in Belize, rates of delivery care satisfying standards of quality increased from 34 to 95 percent (see Table 7) after SMI introduced targeted trainings and technical assistance to obstetrics staff. Health professionals received training on patient monitoring, documentation of vital signs, and consistent administration of oxytocin, which led to fewer cases of postpartum hemorrhage.

Training on the Use of Partographs. The use of partographs, a tool for monitoring labor progress, was implemented in several SMI hospitals to improve maternal healthcare outcomes. In Belize, El Salvador, and Honduras, midwives and hospital staff reported that partograph training helped identify labor risks early and adhere to national guidelines on obstetric care, enhancing the management of obstetric complications and reducing delays in critical referrals. The partographs allowed healthcare workers to monitor vital signs and progression during labor more systematically, supporting timely interventions. These records also enabled clearer communication between midwives, LHCs and hospital staff, ensuring that necessary resources and support were available when required. This coordinated approach, facilitated by SMI, helped reduce maternal mortality by increasing institutional births and early intervention for complicated cases.

The integration of partographs into maternal care under the SMI initiative underscores the importance of standardized monitoring tools in resource-limited settings. The partographs not only empowered midwives and staff with a structured approach to assess labor progress but also aligned care with updated national guidelines. This initiative demonstrated that structured monitoring tools, paired with training, improve maternal healthcare outcomes, ensuring timely and appropriate care during labor and delivery.

As we mentioned before, MCHC policies in El Salvador took a different path in 2021. While hospitals reported an increase from 5 to 14 percent (see Table 7) in the proportion of complications managed effectively between the end of operation 2 and the end of operation 3, the Salvadorian Assembly passed the "Born with Love" Act (*Ley Nacer con Cariño*), which transformed some practices, including the use of partographs in some non-SMI hospitals. For example, in Chalatenango, the staff is transitioning away from the use of traditional partographs as the standard tool for monitoring labor.

Training in Complication Management. The management of obstetric complications under the SMI improved in Belize, El Salvador, and Honduras due to increased training and better infrastructure. According to Table 7, between baseline and operation 3, Belize improved specialist management of complications from 22 to 56 percent of the cases and Honduras from 36 to 65 percent. Obstetrics staff benefited from guides, equipment, and specific training on conditions like postpartum hemorrhage and preeclampsia. The establishment of separate maternity wards also facilitated triage and safe management of obstetric emergencies. Comprehensive training initiatives, such as the Essential Obstetric and Neonatal Care (CONE) in Honduras, equipped staff with essential skills, reinforcing a proactive approach to managing complications. However, most respondents in non-SMI areas also reported improvements in the management of obstetric complications, which is consistent with failing to find positive treatment impact for Honduras for this outcome, as reported in Table 6.

SMI Approach to Delivery in Belize – A Context-Mechanism-Outcome (CMO) Configuration. - In Belize, in addition to refining guidelines and protocols, training on AMTSL, and use of partographs, SMI's technical assistance also included hospital staff training on holding stand up-meetings, using whiteboards in the maternity room and the obstetrics team room, and remote therapeutic monitoring for pregnant women, recent mothers, and neonates.

NORC collected in-depth information via interviews with hospital staff where SMI deployed this strategy to understand the interactions between these SMI initiatives and the delivery care mechanisms in the Belizean network of public maternity wards. The evaluation team used the "Context-Mechanism-Outcome Configuration" (CMO) to explain the influence of interventions on the delivery practices and outcomes of interest. As shown in Table 9, this technique breaks the child delivery mechanisms into the treatment uptake (column 2) and the reasoning social actors make about the treatment (column 4), which mediates their decision to use any of the treatment (column 5). The surrounding institutional and social context (column 3) moderates the adoption of treatment. The extent of use of the newly acquired skill, practice or equipment impacts the intended outcome (column 6). Details on the CMO findings by element of SMI intervention are available in Annex 6.Table 9. Factors Associated to Delivery with Care Outcomes - Belize

Intervention Component	Context[1]	Mechanism		Use[4]	BL – Operation 3 Outcome(s)[5]
		Resources[2]	Reasoning[3]		
TA – AMTSL	Favorable	Partial	Valued	Adopted as planned	A: 34 → 95%
TA – Stand-up meetings	Favorable w/ caveats	Partial	Acknowledged	Partially adopted	A: 34 → 95%
TA – Whiteboard mgmt.	Favorable w/ caveats	Partial	Acknowledged	Partially adopted	A: 34 → 95%

Intervention Component	Context[1]	Mechanism		Use[4]	BL – Operation 3 Outcome(s)[5]
		Resources[2]	Reasoning[3]		
Obstetric care guidelines	Favorable	Effective	Valued	Adopted as planned	A: 34 → 95% B: 22 → 56%
TA – partographs	Favorable	Partial	Valued	Adopted as planned	A: 34 → 95% B: 22 → 56%
TA – RTM	Obstacle	Small evidence	Irrelevant	Partially adopted	B: 22 → 56%
TA – Complication Management	Favorable	Small evidence	Valued	Partially adopted	B: 22 → 56%

Notes: Additional details on the CMO configuration approach and the information collected in the field to establish these contribution paths can be found in Annex 6. (1) The scale for context role in moderating the use of interventions has three levels: favorable, favorable with caveats, and obstacle. (2) The uptake of intervention resources by participants is measured in a three-level scale, including effective uptake, partial uptake, or absent uptake. For cases in which the evaluation obtained no or scarce evidence of uptake, the table notes a "small evidence.". (3) The reasoning mechanisms of participants is captured in three levels: the intervention elements were acknowledged and valued, only acknowledged, or irrelevant. According to the program logic, if participants do not acknowledge and value the newly acquired skill or equipment, the intervention's contribution to use and outcome change is reduced or unlikely. (4) Use of newly acquired skill or equipment is measured in three levels: adopted as planned, partially adopted, and not adopted. (5) Outcome A: % of women in labor who were administered oxytocin or another uterotonic following birth, as part of the active management of the third stage of labor. Outcome B: % of women with obstetric complications (sepsis, hemorrhage, severe pre-eclampsia and eclampsia) were treated according to the norm, as reported in health facility surveys.

Table 9 (above) presents the influence of SMI initiatives on the delivery care at public hospitals in Belize, and to SMI intended outcomes. On row 1, hospital respondents reported staff training on AMTSL in almost all treated facilities, a favorable context of learning and practice towards adopting these techniques, and appreciation for the positive consequences of implementing AMTSL, which led to its frequent use in most maternity wards. On rows 2 and 3, respondents reported that SMI delivered training on both stand-up meetings and whiteboard management in some maternity wards. The institutional context was not as conducive and staff appreciation not as high for these resources as for AMTSL, and therefore, their use was partial. These three interventions aimed to increase the proportion of deliveries managed with quality – reported from 34 to 95 percent (outcome A), according to Table 8.

On row 4, Table 9 indicates that all hospital respondents indicated being aware of adjusted obstetric care guidelines and the training to adopt them. Both the context of implementation and the appreciation for their importance and value were conducive to effective use. Similarly, while not as extensively known across all treatment facilities, the training on partographs (row 5) was also received in a conducive institutional and social context of medical staff that valued the advantages of obtaining partograph data to identify complications at an early stage. These elements promoted an effective adoption of this obstetric practice among nurses and doctors. Training on revised obstetric care guidelines and on partographs aimed to increase the proportion of deliveries managed with quality as well as of management of complications according to norms, which increased from 22 to 56 percent between baseline and operation 3 (outcome B), per Table 8.

While no hospital respondents declared receiving training on obstetrical complication management or remote therapeutic monitoring (RTM) of pregnant women (rows 6 and 7), some of them expressed familiarity with complication management practices and positive institutional

context and appreciation for these skills. In contrast, hospital staff mentioned no presence of RTM equipment at facilities and extremely limited use. Both RTM and complication management training intended to support larger rates of managed delivery complications.

In summary, the SMI intervention designed to improve delivery with care in Belize had a positive contribution to intended outcomes between baseline and operation 3 at varying degrees. First, an increase in the proportion of women who received birth care with quality, according to AMTSL, from 34 to 95 percent (Table 8) found strong contribution from staff training on AMTLS, the use of partographs, and on the obstetric care guidelines revised during SMI implementation. For all three interventions, hospital staff described effective use at the maternity ward and satisfaction with the results from implementing these skills and resources. A more modest contribution to this increase came from SMI's training on stand-up meetings and whiteboard management at the maternity ward. In both cases, their use was partial due to limited uptake of these resources and a partially favorable institutional context. As to the increase in the proportion of women with obstetric complications who received care according to norms, from 22 to 56 percent (outcome B), the CMO analysis found the extended use of partographs contributed to this change. However, the training on complication management and the use of RTM, where recalled, seemed to have a reduced extent of use and therefore, a more modest contribution to outcome B.

Postpartum Care

Below we present three performance indicators regarding postpartum outcomes, based on health facility and household surveys. The indicator for postpartum care with quality measures whether institutional postpartum patients received immediate postpartum care according to best practices within two hours after birth and at discharge, based on health facility records. The other two indicators assess whether contraceptive advice was provided after delivery and whether the first postpartum checkup occurred within seven days of the delivery, as reported in household surveys. Together, these indicators provide an overview of the quality and accessibility of postpartum care services in the SMI sites.

Figure 5 summarizes the results for these three indicators in SMI locations. Panel A shows results for the seven countries where both surveys were conducted for baseline and operation 2, while Panel B shows results for the four countries where operation 3 was conducted.[13] In both panels, the indicators for postpartum care with quality and contraception counseling after delivery shows improvement over time. However, the indicator for the first postpartum check-up within 7 days declined from baseline to operation 2. In Panel B, this indicator shows improvement again from operation 2 to operation 3 for a subset of the countries.

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[13] Information on the postpartum care with quality was not captured in El Salvador and Nicaragua at baseline or during the three rounds in Panama. Additionally, data on contraception advice given after delivery and first postpartum check-up within 7 days are not available for Belize. As a result, these countries were excluded from the pooled results for the corresponding indicators.

Figure 5. Postpartum Care Outcomes in SMI locations

A. Pooled results for Belize, Guatemala, Honduras, Nicaragua, Chiapas (Mexico), Panama, and El Salvador
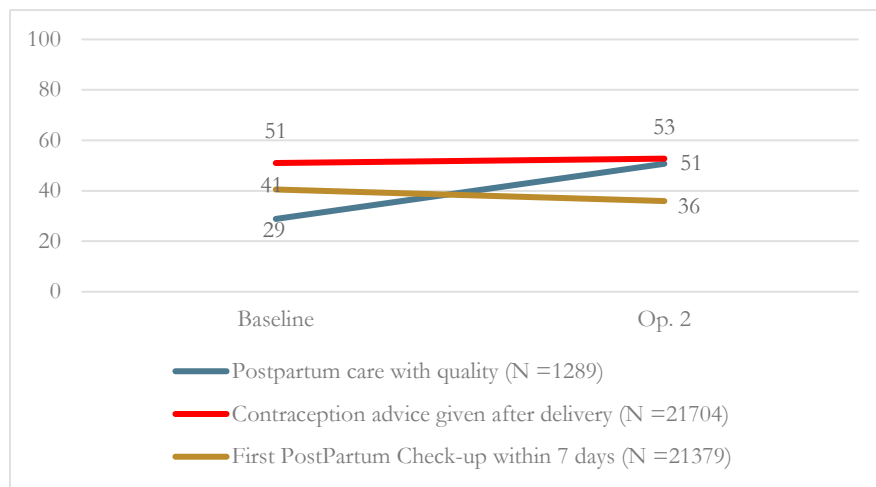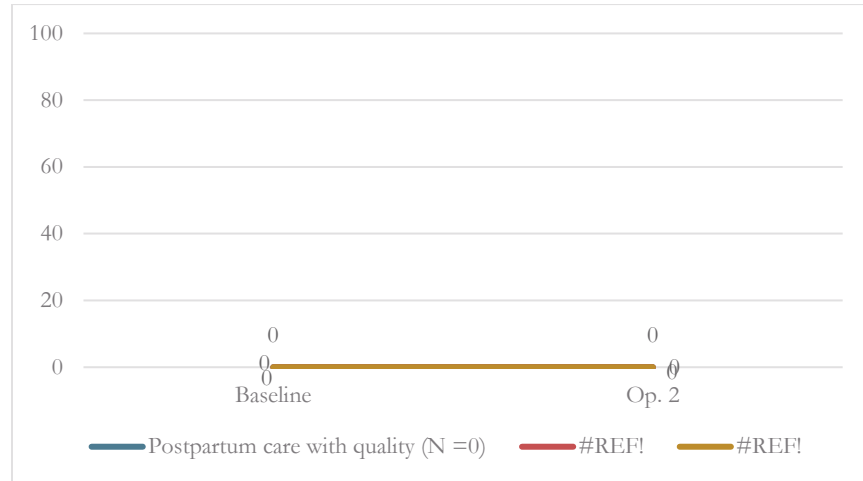
B. Average results for Belize, Honduras, Nicaragua, and El Salvador
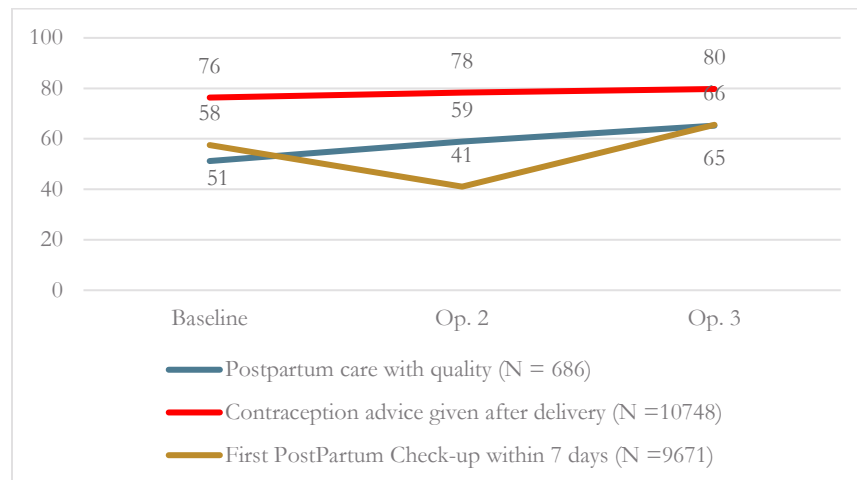
Note: Results represent the average of the unweighted country-specific means. The indicator on postpartum care with quality includes data only for Belize and Honduras.

Table 10. presents the impact evaluation results for postpartum care outcomes under the SMI program. The dependent variable for each set of regressions is the respective indicator for each of the postpartum care outcomes introduced above. The key findings are as follows:

- Panel A reports results for women receiving immediate postpartum care that adhered to established standards (1 if yes, 0 otherwise). Positive impacts were noted in Mexico during operation 2, where women delivering in the SMI locations were 37 percentage points more likely to receive norm-compliant immediate postpartum care than those in comparison areas.

- Panel B presents results for contraceptive counseling provided after delivery. In operation 2, Guatemala reported a statistically significant positive impact of nine percentage points, while the other countries showed no significant change.

- Panel C shows results for first postpartum check-up within seven days. At the end of operation 2, Guatemala showed a significant positive impact of 14 percentage points, while the other countries showed no significant change.

Table 10. Impact of SMI – Postpartum care outcomes (percentage points)

	Guatemala	Honduras	Mexico	Nicaragua	All-Op.2	Honduras and Nicaragua Op. 2&3
	(1)	(2)	(3)	(4)	(5)	(6)
A. Postpartum care with quality						
Op. 2 impact	0.21	0.16	0.37**		0.13	
	(0.22)	(0.18)	(0.12)		(0.11)	
Op. 3 impact		0.24				
		(0.18)				
N	538	796	659		1755	
Mean at BI	0.16	0.68	0		0.25	
B. Contraception advice given after delivery						
Op. 2 impact	0.09*	-0.04	0.07	-0.04	0.04	-0.05
	(0.04)	(0.04)	(0.06)	(0.03)	(0.03)	(0.05)
Op. 3 impact		-0.07		-0.00		-0.05
		(0.05)		(0.03)		(0.04)
N	7496	6027	7968	5934	24382	11961
Mean at BI	0.14	0.69	0.33	0.80	0.36	0.75
C. First postpartum check-up within 7 days						
Op. 2 impact	0.14*	-0.11	-0.04	-0.11	-0.00	-0.10
	(0.06)	(0.07)	(0.05)	(0.06)	(0.05)	(0.10)
Op. 3 impact		0.11		-0.03		0.04
		(0.06)		(0.05)		(0.05)
N	7419	5963	7952	5255	24253	11218
Mean at BI	0.18	0.50	0.34	0.64	0.34	0.57

Note: (1) Postpartum Care with Quality (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status). (2) Contraception advice given after delivery (HH data): Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health

insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. (3) First postpartum check-up within 7 days (HH data): Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. Standard errors in parentheses. HH data: Standard errors are clustered at the *Gestor* level for Honduras and the municipality level for the other three countries. HF data: Standard errors are clustered at the facility level for regressions that do not include operation 3, and the facility-year level for regressions that include operation 3.

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Excluding contaminated municipalities in Chiapas and Nicaragua (see results in Annex 3) causes a shift in significance for some coefficients, yet the coefficients themselves remain quite similar to those in Table 8.

Table 11 shows postpartum outcome indicators for countries where qualitative data was collected.

Table 11. Progress in SMI areas – Postpartum outcomes

	Postpartum care with quality			Contraception advice given after delivery			First Postpartum Check-up within 7 days		
	Bl	Op.2	Op.3	Bl	Op.2	Op.3	Bl	Op.2	Op.3
Belize	0.35	0.27	0.49	--	--	--	--	--	--
Honduras	0.68	0.91	0.81	0.72	0.83	0.86	0.51	0.59	0.55
El Salvador	--	0.49	0.08	0.79	0.82	0.78	0.62	0.31	0.54

Note: Postpartum care with quality measures whether institutional postpartum patients received immediate postpartum care according to the best practices within two hours after birth and at discharge, according to health facility surveys. Contraceptive counseling after delivery and whether the first postpartum check-up occurred within 7 days were assessed through household surveys.

The quantitative data in Table 9 shows an improvement in postpartum care with quality in Belize over the baseline and operation 3, while results in Honduras show a substantial improvement between baseline and operation 2, but a decline between operation 2 and 3. The decrease in the proportion of postpartum cases assisted with quality in El Salvador is contrasting and large. The qualitative information, however, indicates an improvement in postpartum care with quality for SMI locations across all three countries – Belize, Honduras and El Salvador – due to the implementation of new guidelines. Qualitative data respondents across all three countries also reported an increase in postpartum coverage, that is, a larger number of women doing a postpartum follow up visit within the first week (7 days) of giving birth during SMIs 2nd and 3rd operation pre-pandemic. This complements the quantitative data for El Salvador but not for Honduras which shows a slight decline for this period.

Additionally, non-SMI locations in El Salvador and Honduras also reported changes in postpartum coverage between during this period. Respondents in El Salvador mentioned more detailed monitoring and screenings of mothers and newborns, and respondents and interviewees in Honduras agreed that women were receiving postpartum care at an increased rate in the first week after giving birth due to educational programming, awareness campaigns and routine home checks. This fact may explain why there are no significant differences

between SMI and non-SMI areas in Honduras, as shown in Table 8, Panel C. There were no reported changes in postpartum quality care in non-SMI locations.

Factors Affecting Postpartum Coverage: In Belize SMI locations, two reasons were cited for the improvement in coverage – partnerships and strengthened working relationships between nurses, CHW and midwives; and education and outreach on why postpartum care was important, which included brochures on danger signs and visits to new mothers after birth. This was particularly vital in the case of postnatal complications suffered by women. Postpartum coverage also improved due to timely and informative referral mechanisms. Midwives in one location mentioned that when patients were discharged, they were assigned a CHW or a nurse who would then follow up to check for complications. Hospital staff also noted that mothers were given a date within three days to come back in for a checkup, an improvement from the seven-day mark that was attributable to increased human resources. Detailed education on matters such as the importance of breastfeeding and the urgency of complications also encouraged them to seek help earlier.

In El Salvador the LHD in one SMI location reported the creation of a list of women who gave birth in hospitals and required postpartum care, so that CHWs could schedule appointments either at home or the health center. In another SMI location hospital and local health center staffers both mentioned that once women were discharged from the hospital, health promoters followed up with the women at home and referred them to the health units which increased the number of postpartum visits. In Honduras, hospital staff attributed the increase in postpartum visits within the first seven days to the implementation of control cards with the dates of the check-ups and monthly meetings to enhance coordination with the health network and ensure continuity of care after discharge. Another SMI hospital established a gynecology outpatient clinic to give postpartum care to women whose babies were still hospitalized and chose to wait in the hospital with their babies; before, these women may not have attended their appointments at the LHC. Moreover, another staff at this hospital emphasized that they contacted patients to emphasize the importance of follow-up visits at three days, seven days, and 40 days postpartum.

> *"We were increasing the coordination with the hospital, and we had the goal that every child and every woman was evaluated in the first three days. And we work, and to date we continue to the same things. [The] truth is that they have worked for us. We have prevented deaths as a result of the postpartum evaluation we have had."*

Hospital staff in non-SMI locations in El Salvador also said the hospitals began implementing vaccination schedules, specifically with BCG and hepatitis, and referring women to conduct postpartum care in LHCs. Another hospital staff mentioned that now there is more detailed monitoring of postpartum women, where they can better identify and treat possible complications while another reported that most women attended the postpartum check-ups at the local health clinic due to the education conducted by CHWs. The respondent also mentioned that they continue communication even when the postpartum women move away to a different community, to make sure they continue treatment.

Between 2015 and 2019, midwives across SMI communities in Honduras also reported following a protocol for the active follow-up of women who had just given birth. This follow-up generally involved checking in on the mother's health, particularly if she experienced any discomfort or symptoms of complications such as bleeding, and then encouraging her to visit the LHC for necessary treatment. One reported the follow up typically occurred on the seventh day postpartum. In Honduras, non-SMI health care centers attributed improved coverage to the monitoring conducted by health teams. According to LHD staff, 100 percent of postpartum women were and are being currently monitored for 40 days after delivery. These check-ins encourage women to visit local health centers soon after they gave birth, with one CHW noting that many women came in as early as three days due to the educational information they received on danger signs. These monitoring results help explain the absence of significant differences between SMI and non-SMI in Table 8.

Factors Affecting Postpartum Quality Care: SMI locations across all three countries reported that monitoring the mother every 15 minutes after delivery helped improve the quality of care, since this standard was key for checking blood pressure, bleeding, and ensuring that other vitals were normal. In Honduras, in addition to monitoring every 15 minutes during the first hour postpartum, respondents also noted monitoring every 30 minutes during the second hour and continuing this up to 12 hours to ensure timely detection of potential risks. Key practices included the introduction of standardized clinical formats and checklists, which guided healthcare providers in consistently monitoring vital signs, uterine contraction, bleeding, and overall patient condition. Furthermore, hospital staff in Intibucá reported that women with pregnancy complications (such as preeclampsia) or who had a cesarean section stayed at the hospital for 72 hours under observation.

> *"This is very important for the patient because by doing it more frequently, if there's something that is not going as should normally go, for example, if the patient is bleeding, taking the vital signs and checking them more frequently, we can detect this problem on a timely manner and act now and treat it."*

Previously, some women in Belize did not seek postpartum care within the first week due to traditional beliefs and social norms. However, specific appointment times and counseling by LHC staff caused some to eventually seek out treatment. In contrast, the majority of respondents did not mention any changes in postpartum quality care in non-SMI locations in El Salvador. Only hospital staff in one non-SMI location said that more neonatal and cardiac screenings were taken, and if necessary, more extreme patients were taken to third level of operations. In Honduras, midwives in one non-SMI shared feeling threatened, as they were told they risked imprisonment if their charges (mother or child) died while on duty. In an FGD, one midwife said, *"they told us that if a child died it would be 15 years in prison, if a women died, it would be another 15."* Hospital staff in the same non-SMI location in Honduras also revealed that they had heard of lawsuits if hospital care (blood pressure monitoring, frequency of checks) was not immediately provided to postpartum women, which made it difficult for them to complete their duties. However, they noted that the improved training provided to doctors in the area contributed to improved medical postpartum care.

<u>Inquiry into Maternal Deaths</u>: In Honduras hospital staff in SMI locations reported a detailed and systematic 3-step protocol for analyzing and following up on maternal deaths to prevent future complications. First, when a maternal death occurred, it was immediately documented, and a group of all personnel involved in the patient's care was convened to review and discuss the case. Second, the case would then be presented to the regional Maternal Mortality Committee (one hospital explained this presentation happened within 3-5 days). This committee reportedly included department heads and the director of epidemiology. Hospital staff said the committee analyzed factors such as delays in care, systemic issues, and individual responsibilities. Third, the committee's findings were then shared with MoH and the Sub Directorate of Information. The analysis would determine whether the death was preventable and what could be done to avoid similar incidents in the future. In El Salvador one LHD mentioned a committee that follows-up and analyzes maternal deaths in hospitals, called the *Comités de Análisis Materno Infantil* (CAMI), which analyses maternal mortality cases every month – more severe cases are sent to the Elementary System for Integral Health or SIBASI (*Sistema Básico de Salud Integral*) to be analyzed, where weaknesses are identified, and new guidelines developed. Lastly, hospital staff in one location reported training for MNCH healthcare staffers to detect high-risk pregnancies.

Neonatal

For neonatal outcomes, we focused on three performance indicators based on health facility and household surveys. The first indicator, management of neonatal complications, assesses whether neonates with birth complications (such as prematurity, low birth weight, birth asphyxia, or sepsis) were treated according to established guidelines, as reported in health facility surveys. The second indicator, routine newborn care with quality, evaluates whether neonates received immediate postpartum care from medical personnel in line with standards, based on health facility surveys. The third indicator assesses whether infants received their first postnatal checkup from skilled personnel within 7 days of birth, as reported in household surveys.

Figure 6 summarizes the results for these three indicators in SMI locations: i) The proportion of neonates with birth complications managed according to the norm in the last two years; ii) The proportion of infants who received immediate postpartum care after birth; and iii) The proportion of infants who received the first neonatal check-up within 7 days of birth in the last two years. Together, these indicators provide an overview of the coverage and quality of neonatal care services in the SMI locations. Panel A shows results for the seven countries where both surveys were conducted for baseline and operation 2, while Panel B shows results for the four countries where operation 3 was conducted.[14] The outcomes for the three indicators showed improvement from baseline to operation 2 in both panels. In Panel B, the indicator on the management of neonatal complications and the first postnatal check-up within 7 days improved

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[14] Information on the management of neonatal complications was not captured in El Salvador at baseline nor during the three rounds in Panama. Data on routine newborn care with quality was not captured at baseline for El Salvador. Additionally, data on the first neonatal check-up for infants within 7 days of birth are not available for Belize, Mexico, and Nicaragua. Consequently, these countries were excluded from the pooled results for the corresponding indicators.

over time, while the indicators for routine newborn care quality showed a slight decline from operation 2 to operation 3.

Figure 67. Neonatal Outcomes in SMI locations

A. Pooled results for Belize, Guatemala, Honduras, Nicaragua, Chiapas (Mexico), Panama, and El Salvador
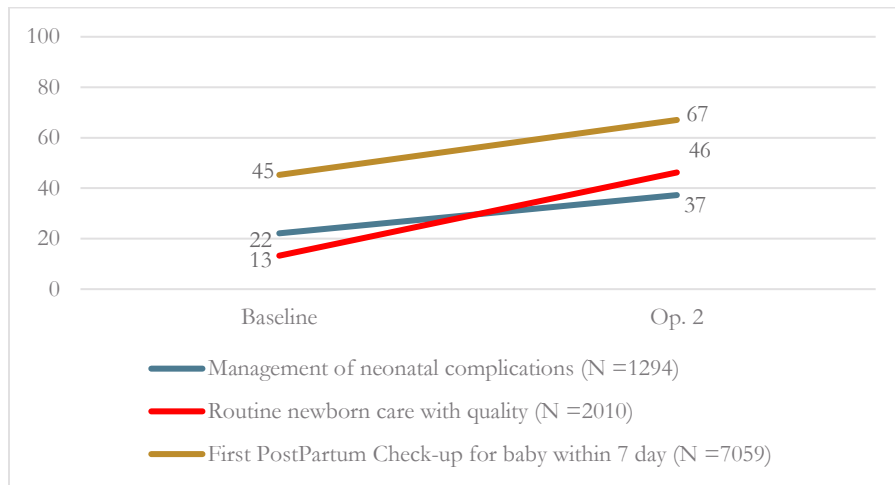
B. Pooled results for Belize, Honduras, Nicaragua, and El Salvador

Note: Management of neonatal complications evaluates whether neonates with birth complications (prematurity, low birth weight, birth asphyxia, or sepsis) were treated in accordance with established guidelines, as reported in health facility surveys. Routine newborn care with quality assesses whether neonates received immediate neonatal postpartum care according to standards from medical personnel after birth, also based on health facility surveys. First postpartum checkup for baby within 7 days, assesses whether infants received their first postnatal checkup from skilled personnel within 7 days of birth, as reported in household surveys.

Table 10 presents the impact evaluation results for neonatal care outcomes under the SMI program. The dependent variable for each set of regressions is the respective indicator for each of the neonatal care outcomes introduced above. The key findings are as follows:

- Panel A reports results for the proportion of infant records with neonatal complications receiving treatment that adhered to established standards (1 if yes, 0 otherwise). Honduras saw a significant improvement of 32 percentage points in operation 2, and another 49-percentage point increase in operation 3. Nicaragua observed a significant positive impact of 36 percentage points in operation 3. When pooling data from the four countries together, the results from operation 2 show a significant positive impact of 14 percentage points. Evaluating the SMI program's impact across the two operation follow-ups, we find a positive impact of 22 percentage points in operation 2 and another 37-percentage point increase in operation 3 when pooling Honduras and Nicaragua results.

- Panel B shows results for the routine newborn care with quality indicator. In operation 2, Guatemala showed a significant positive impact of 31 percentage points. In operation 3, Honduras observed a significant positive impact of 34 percentage points.

- Panel C shows the results for first postpartum check-up for baby within 7 days indicator. Honduras saw a significant improvement of 12 percentage points in operation 3. Nicaragua observed a negative impact of -10 percentage points in operation 2, and another small, negative impact of -8 percentage points in operation 3.

Table 12. Impact of SMI – Neonatal care outcomes (percentage points)

	Guatemala	Honduras	Mexico	Nicaragua	All-Op.2	Honduras and Nicaragua Op. 2&3
	(1)	(2)	(3)	(4)	(5)	(6)
A. Management of neonatal complications						
Op. 2 impact	0.09	0.32***	0.02	0.18	0.14*	0.22*
	(0.07)	(0.09)	(0.13)	(0.13)	(0.06)	(0.10)
Op. 3 impact		0.49***		0.36*		0.37***
		(0.08)		(0.15)		(0.09)
N	330	458	290	840	1571	1298
Mean at Bl	0.14	0.09	0.20	0.40	0.24	0.29
B. Routine Newborn Care with Quality						
Op. 2 impact	0.31**	0.14	-0.12	0.06	0.10	0.12
	(0.10)	(0.15)	(0.23)	(0.13)	(0.09)	(0.13)
Op. 3 impact		0.34*		0.12		0.23
		(0.14)		(0.11)		(0.12)
N	553	806	521	653	2083	1459
Mean at Bl	0.01	0.26	0.17	0.06	0.14	0.21
C. First Postpartum Check-up for Baby within 7 days						
Op. 2 impact	0.02	-0.04	-0.08	-0.10*	-0.04	-0.07
	(0.10)	(0.06)	(0.05)	(0.05)	(0.03)	(0.04)
Op. 3 impact		0.12*		-0.08*		0.04
		(0.05)		(0.03)		(0.06)
N	2,730	4,484	4,668	4,181	14,115	8,665
Mean at Bl	0.53	0.79	0.69	0.92	0.72	0.86

Notes: (1) Management of neonatal complications (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status), complication type, and facility fixed effects. For regressions that include data from operation 3 (columns 6-8) we do not include facility fixed effects because facility identifiers were not available for the that operation. Instead, we included a treatment indicator. (2) Routine Newborn

Care with Quality (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status) and health facility classification. (3) First Postpartum Check-up for Baby within 7 days (HH data): Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures), and municipality and operation fixed effects. Standard errors in parentheses. HH data: Standard errors are clustered at the *Gestor* level for Honduras and the municipality level for the other three countries. HF data: Standard errors are clustered at the facility level for regressions that do not include operation 3, and the facility-year level for regressions that include operation 3.

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Results excluding contaminated municipalities in Chiapas and Nicaragua are shown in Annex 3. There are a few differences worth highlighting. Table 10 shows that for Chiapas, the impact of SMI on routine care with quality for operation 2 was 12 negative percentage points but not statistically significant. The effect excluding contaminated municipalities reaches 50 negative percentage points. This latter result is driven by a notable improvement for this indicator in the few comparison facilities left after excluding the contaminated municipalities. In the case of Nicaragua, Table 10 shows negative and statistically significant coefficients for First Postpartum Check-up for Baby within 7 days. These coefficients are substantially smaller in absolute value and not significant when contaminated municipalities are excluded. It is possible that the partial treatment received by contaminated municipalities is pulling down the estimated treatment effects when included in the regression.

Table 13. Progress in SMI areas – Neonatal outcomes

	Management of neonatal complications			Routine newborn care with quality			First Postpartum Check-up for baby within 7 days		
	BI	Op.2	Op.3	BI	Op.2	Op.3	BI	Op.2	Op.3
Belize	0.24	0.51	0.56	0.30	0.90	0.48	--	--	--
Honduras	0.11	0.43	0.70	0.22	0.75	0.79	0.78	0.74	0.78
El Salvador	--	0.06	0.40	--	0.89	0.63	0.13	0.65	1.00

Note: Management of neonatal complications evaluates whether neonates with birth complications (prematurity, low birth weight, birth asphyxia, or sepsis) were treated in accordance with established guidelines, as reported in heath facility surveys. Routine newborn care with quality assesses whether neonates received immediate neonatal postpartum care according to standards from medical personnel after birth, also based on health facility surveys. The last indicator, first postpartum checkup for baby within 7 days, assesses whether infants received their first postnatal checkup from skilled personnel within 7 days of birth, as reported in household surveys.

Management of Neonatal Complications. – As displayed in Table 11, health facility surveys suggest an overall increase in the proportion of neonatal complications handled according to established guidelines in Belize, Honduras and El Salvador. Evaluation respondents identified diverse factors for this change between baseline and operation 3. Particularly in Belize, where the proportion of neonatal complications handled increased from 24 to 56 percent, awareness campaigns during community visits, including educational sessions led by CHWs, guidance and advice to recent mothers to immediately attend a LHC to handle a neonatal complication, and the distribution of informational pamphlets seem to have provided CHWs with an important source of constant training on complication management to recent mothers.

"I think one of the things that helped us when it comes to improvement is the information given to us, cause we were continually being trained in that area, and the pamphlets and information created for that specific area that helped fight the challenges of CHW, cause when it comes to newborns, when it comes to mothers they have myths, they have different ideas and so we had pamphlets that we could pass down to the CHW." (BE)

CHWs in Belize added that during home visits, recent mothers received explanations about the exact checks carried out on infants (umbilical cord, temperature, stimulation etc.), assisting them in reducing their anxiety.

In El Salvador and Honduras, local respondents indicated that training of LHC and CHWs to identify risk symptoms, including fever, labored breathing, lethargy, or refusal to breastfeed was instrumental in preventing fatal risks in newborns, such as sepsis. CHWs in SMI communities in both countries explained they were taught to act immediately, either by taking the infant to the health center themselves or by contacting a local health promoter, who would then ensure the baby received prompt medical attention. Furthermore, in Honduras, the proportion of neonatal complications handled according to established guidelines increased from 11 to 70 percent (Table 11), due to: (1) the introduction of national guidelines – including protocols and checklists on neonatology – to reduce errors in implementation; (2) creating a rotating schedule where staff would work weekends to provide care to babies who needed it; and (3) reducing the timeframe for the first newborn evaluation to be made within the first three days after birth instead of seven days, which allowed for early risk identification. Due to a lack of neonatologists, hospital staff reported that pediatricians handled neonatal cases, and regular quality review meetings addressed complications such as asphyxia and sepsis.

The health professionals also met challenges. For instance, hospitals staff and LHC staff reported they faced temporary shortages in neonatal care resources like antibiotics, and the absence of incubators, which affected their ability to properly manage newborns with complications. As reported by a hospital staff in Santa Rosa de Copan: *"We didn't have adequate incubators back then and we had not enough funding to get one, until three or four years ago."* Respondents also described challenges in the communities they serve, including the preference of some villages and towns in El Salvador to use community-based healers (*curanderos*) instead of LCH services.

Routine newborn care with quality. – Table 11 shows a very sharp increase from 30 to 90 percent of newborns in Belize receiving immediate neonatal care postpartum from medical professionals according to standards between baseline and the end of operation 2, to later go down to 48 percent by the end of operation 3. As noted in the section *Effect of COVID-19 on Life Cycle Services* below the distancing measures and other travel restrictions between communities in Belize due to the COVID-19 pandemic are a likely contributor to this decline. Nevertheless, health professionals indicated that a series of care practices became standard in the attention of newborns and that helped to avoid missing potential problems with newborns overall.

There is no information about the percentage of newborns receiving immediate care according to standards from medical personnel at baseline for El Salvador. Table 11 shows the indicator at 89 percent at the end of operation 2 and down to 63 percent at the end of operation 3. While

respondents reported neither an increase nor a decrease in this indicator, some local health centers respondents indicated that it was possible that an increase was promoted by the implementation of the "Equipos Comunitarios de Salud" for family care and specialized care (ECOS)[15], launched in 2010, prior to SMI. The initial target population of ECOS was 100 of the poorest municipalities in El Salvador and extended to 164 by 2017. While the new guidelines formalized during SMI prescribe postpartum routine review within seven days after birth, the ECOS operational guidance revised in 2017 indicates that local health staff from the family care ECOS and the specialized ECOS share the responsibility to visit a newborn several times after delivery: within 24 hours, then within 72 hours, within seven days, within 14 days, and within 21 days.

In Honduras health facility surveys reported an increase from 22 to 75 percent in the proportion of immediate neonatal postpartum care provided according to standards from medical personnel between baseline and operation 2 and a further increase to 79 percent by the end of operation 3 (Table 11). Health care center and hospital staff identified two main factors for the increase in quality of newborn care: (1) the adoption of the H1C form (hoja H1C) across hospitals and LHCs, and (2) training and management changes at LHCs during SMI. The "H1C" neonatal clinical history form is a guide and an instrument to conduct a comprehensive head-to-toe physical examination of newborns, document the birth history, assess for congenital malformations, identify risks, and provide parental guidance. Respondents suggested that its adoption and the establishment of protocols for neonatal care contributed to the reduction of neonatal deaths. A LHC staffer describes the experience implementing the H1C form:

> *"In the first three days, we began to implement a sheet, a neonatal medical history of the newborn, where SMI was implemented. And with it, we do the cephalic to caudal physical assessment, right? We measure, we record the patterns of defecation, congenital malformations, etc. The whole pregnancy records; it's a very, very general, history of the child's birth."*

Additionally, respondents at LHCs reported receiving continuous training whenever new indicators were introduced. A staff member underscored the role of continuous training in increasing neonatal visits, adding that *"the quality of care was increased as the number of newborns assessed by professional staff, trained by physicians increased".* LHC staff also reported to have received training to better identify and manage neonatal risks, such as sepsis. Furthermore, efforts to reduce neonatal mortality led to implementing a rotating schedule where staff would work weekends to provide quality care.

First Postpartum Check-up for Baby within 7 Days. – While no household survey data on the percentage of babies that received postpartum check-up within 7 days were available for Belize, El Salvador was the only operation-3 countries whose coverage increased, and coverage in Honduras remained stable between baseline and operation 3. Nevertheless, women and CHW

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[15] The "ECOS Familiar" are small first-level healthcare units located at the "Unidades Comunitarias de Salud Familiar" (UCSF). Each ECOS Familiar assist about 3,000 residents on average in rural areas and about 7,000 residents in urban areas. The family care ECOS work in coordination with the specialized care ECOS locally. For more information about ECOS, see its operation guidance document available at: https://platform.who.int/docs/default-source/mca-documents/policy-documents/operational-guidance/SLV-MN-62-02-OPERATIONAL-GUIDANCE-2017-esp-Lineamientos-tecnicos-para-los-Ecos-Familiares-y-Ecos-Especializados.pdf.

respondents in Belize said baby check-up visits within the first week after birth increased during SMI implementation. CHWs acted as links between communities and local health services and were instrumental to building trust and familiarity with the postpartum services.

On the one hand, CHWs in Belize identified two factors that influenced this surge in postpartum visits within the first week of life: (1) the community outreach to educate new mothers and (2) the post-clinic referral system for new mothers to nurses, the latter especially in LHCs. In addition, during the SMI implementation, understanding the community characteristics and being responsive to social norms and alternative approaches to neonatal care and vaccinations was also essential to increase recent mothers' attendance at these checkups.

On the other hand, recent mothers and CHWs in Belize reported improvements and expansions of the services provided to newborns. New mothers in one SMI area, for instance, mentioned positive experiences at postpartum check-up appointments, where they reported receiving thorough reviews on postpartum factors and neonatal care for their newborns. CHWs in other SMI areas said that the health centers worked diligently to accommodate mothers who were late to or missed their appointments.

The proportion of newborns attending their check-ups withing 7 days after birth increased from 13 percent to all newborns in El Salvador between baseline and the end of operation 3, as shown in Table 11. The respondents' perceptions were mixed about the effectiveness and changes in the rate at which babies were receiving neonatal check-ups. On the one hand, health center staff recorded increased postpartum care and stable rates at which newborns received quality care during SMI. In a SMI area, health center staff reported new strategies adopted in the pre-pandemic period, including CHW home visits to teach women in reproductive age about the importance of the first-week checkups and refer mothers to the LHC. CHW also distributed pamphlets containing information regarding first-week care, vitamins, vaccines, and supplements to women in reproductive age. However, health center staff in a different area reported that no new SMI guidelines were developed, although they mentioned the existence of new equipment and supplies for newborns and children. In a different SMI region, LHC staff reported difficulties in achieving the 7-day checkup, as well as the 42-day check-up, because recent mothers did not deem it necessary to go to the LHC as long as the newborn seemed well. Respondents also mentioned that lower socio-economic status imposed further barriers for recent mothers to take advantage of neonatal checkups, especially in Masahuat and Tacuba, hampering neonatal care efforts.

Several LHC staff across SMI communities in Honduras noted an increase in the number of neonates receiving immediate care within the first seven days of birth and attributed it to the home visits to promote awareness and prompt attendance, a financial incentive for new mothers, and the use of the H1C form. One local health center staff emphasized this point: *"Visits increased as we implemented the newborn assessment form".* However, as Table 11 shows, the health facilities data indicate that visits remained around 78 percent in Honduras from baseline to the end of operation 3.

According to health center staff when the mother did not bring the child within the first three days, personnel conducted home visits to locate and provide care for the child. A midwife described a home visit:

> *"We got to their homes to see how the child was doing, if he was right or wrong. To advise their mother about the dangers that they could have and that they should not stay at home but go out to the health center in case of any problem, because one is no longer capable of managing complication, as doctors can."*

Surveyed CHW also mentioned that new mothers received a stipend from local health centers, which could benefit newborn health by allowing recent mothers to cover their transportation within three days after their birth, or in case of emergency or purchase essential items. Surveyed mothers expressed overall satisfaction with the care their newborns received at LHCs.

However, not all SMI communities reported improvements. Two LHC staff members reported no notable changes in the quality of newborn care during SMI in their area. They said the quality was maintained and they conducted structured evaluations on newborns within the first seven days of life. Likewise, in another two areas, LHC staff reported the number of neonates receiving care remained constant during SMI due to the committed efforts of healthcare teams to ensure that all newborns received timely attention.

Children Health

Household surveys included several questions on children's health and vaccination status. Figure 7-Panel A shows results for the seven countries where household surveys were conducted. All three indicators had relatively small improvements between baseline and the end of operation 2. In Panel B we show results for the four countries where operation 3 was conducted. Between baseline and operation 2 there were improvements across all three indicators, but by operation 3, the micronutrients consumption indicator declined to the baseline level, and the deworming indicator decreased to even lower levels. The MMR vaccination compliance continued raising although its improvement trend deaccelerated. As we will discuss below, this is likely the results of the COVID-19 pandemia.

Figure 78. Children's access to health in SMI areas

  A. Pooled results for Belize, Guatemala, Honduras, Nicaragua, Chiapas (Mexico), Panama and El Salvador

B. Pooled results for Belize, Honduras, Nicaragua, and El Salvador

Note: Results correspond to the average of each (unweighted) country-specific mean. Micronutrients consumption is defined for children 6-23 months old that consumed at least 50 sachets of micronutrients in the last 6 months. Deworming is defined for children between 1 and 6 years old that received at least two doses of medication in the last 12 months. MMR compliance is defined for children between 1 and 6 years old that had received their MMR vaccinations (measles, mumps and rubella) according to their vaccination card.

Table 12 shows the impact evaluation results for children's indicators.[16] The column structure follows what has been explained before.

- Panel A shows regression results where the dependent variable is binary, equal to 1 if the child consumed at least 50 sachets of micronutrients in the past 6 months, and 0 otherwise. For operation 2 we found positive impacts for Guatemala and Honduras. The results indicate that children in Guatemala in SMI areas were 9 percentage points more likely to have consumed 50 or more micronutrients sachets than their counterparts in

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[16] In Annex 3 results for Nicaragua and Mexico excluding the comparison municipalities that were part of the catchment area of a treated higher-level facility are shown. Most of the results do not change in a meaningful way, compared to the results shown in Table 12.

comparison areas, while the figure for Honduras is 27 percentage points. These are substantial impacts considering that the values at baseline were small (4 percent in Guatemala and 0 percent in Honduras, as shown at the bottom of Panel A). Although there are no impacts in Chiapas or Nicaragua, the pooled results are significant but only for operation 2.[17]

- Panel B reports results for a binary variable indicating whether children received at least two doses of deworming medication in the last 12 months. In this case, there is also a positive impact for Guatemala of 16 percentage points.

- Panel C shows results for MMR vaccination results. No significant positive impacts are found for this indicator, and there is one negative coefficient for Honduras, of 6 percentage points, during operation 2 only. Notably, in Honduras, the percentage of MMR vaccinated children at baseline in SMI areas was 86 percent, 8 percentage points higher than in comparison areas. Although the percentage in SMI areas by operation 2 increased to 90 percent, comparison areas had partially closed the gap, and the difference was 3 percentage points, which is why there is a negative correlation between SMI and this indicator in operation 2.

Table 14. Impact of SMI – Children's access to healthcare (percentage points)

	Guatemala	Honduras	Mexico	Nicaragua	All-Op.2	Honduras and Nicaragua Op. 2&3
	(1)	(2)	(3)	(4)	(5)	(6)
A. Micronutrients consumption of 50 or more sachets						
Op. 2 impact	0.09**	0.27***	-0.04	0.01	0.08**	0.15**
	(0.03)	(0.06)	(0.02)	(0.01)	(0.03)	(0.05)
Op. 3 impact		0.01		-0.00		0.01
		(0.01)		(0.02)		(0.03)
N	2579	2023	2545	1980	8177	4003
Mean at Bl	0.04	0.00	0.02	0.00	0.02	0.00
B. Deworming more than twice in last 12 months						
Op. 2 impact	0.16***	-0.07	-0.06	0.00	0.01	-0.03
	(0.04)	(0.06)	(0.06)	(0.04)	(0.03)	(0.04)
Op. 3 impact		-0.01		-0.00		-0.00
		(0.03)		(0.06)		(0.04)
N	6044	5353	6454	4987	20256	10340
Mean at Bl	0.16	0.39	0.26	0.32	0.25	0.36
C. MMR compliant According to Card (missing=., no card=0)						
Op. 2 impact	-0.08	-0.06*	0.00	0.00	-0.04	-0.03
	(0.07)	(0.03)	(0.06)	(0.04)	(0.04)	(0.04)
		0.04		-0.03		-0.00

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[17] Note that a strategy for improving the provision of micronutrients by health facilities and community platforms was not implemented in Mexico (Chiapas), Belize or Panama.

	Guatemala	Honduras	Mexico	Nicaragua	All-Op.2	Honduras and Nicaragua Op. 2&3
	(1)	(2)	(3)	(4)	(5)	(6)
Op. 3 impact		(0.04)		(0.04)		(0.03)
N	6393	5539	6700	5145	21113	10684
Mean at Bl	0.78	0.84	0.48	0.65	0.66	0.75

Notes: Results correspond to the average of each (unweighted) country-specific mean. Micronutrients consumption is defined for children 6-23 months old that consumed at least 50 sachets of micronutrients in the last 6 months. Deworming is defined for children between 1 and 6 years old that received at least two doses of medication in the last 12 months. MMR compliance is defined for children between 1 and 6 years old that had received their MMR vaccinations (measles, mumps and rubella) according to their vaccination card. Linear probability models controlling for children's characteristics (age group, gender and year of birth); mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status); household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures), and municipality and operation fixed effects. Standard errors in parentheses. Standard errors are clustered at the *Gestor* level for Honduras and the municipality level for the other three countries.

* $p<0.05$ ** $p<0.01$ *** $p<0.001$

Regarding the results excluding contaminated municipalities in Chiapas and Nicaragua, shown in Annex 3, most of the results are not statistically significant, as is the case for Chiapas and Nicaragua in Table 12.

Table 15 shows children's indicators for countries where qualitative data was collected.

Table 15. Progress in SMI areas – Children outcomes

	Micronutrients consumption of 50 or more sachets			Deworming more than twice in last 12 months			MMR compliant According to Card (missing=., no card=0)		
	Bl	Op.2	Op.3	Bl	Op.2	Op.3	Bl	Op.2	Op.3
Belize	0.0	0.0	0.0	28.8	46.0	41.4	47.5	57.3	73.3
Honduras	0.2	30.2	0.0	39.4	26.4	27.3	83.6	90.0	74.1
El Salvador	--	38.7	--	35.4	40.7	21.9	67.2	71.1	67.8

Note: Household surveys. Unweighted. Micronutrients consumption is defined for children 6-23 months old that consumed at least 50 sachets of micronutrients in the last 6 months. Deworming is defined for children between 1 and 6 years old that received at least two doses of medication in the last 12 months. MMR compliance is defined for children between 1 and 6 years old that had received their MMR vaccinations (measles, mumps and rubella) according to their vaccination card.

Micronutrients**. –** During the operation 2 period, both SMI and non-SMI communities in Honduras, Belize and El Salvador experienced an overall improvement in micronutrient distribution for children. In Honduras, SMI communities saw increased awareness and intake of micronutrients, supported by community health workers and regular home visits. The primary micronutrients provided were *Chispita* powder and iron sulfate drops, which were praised for being easy to administer. Notable improvements in children's health were reported, including weight gain, increased energy, and overall better physical condition. Meetings like "*Atención Integral al Niño en la Comunidad*" further boosted efforts, with regular monitoring of child growth and counseling on nutrition. Non-SMI areas also benefited from a consistent supply of

micronutrients thanks to donations from the World Food Program but faced occasional shortages. The impact evaluation estimates in Table 12 show that the increase was larger in SMI than in non-SMI communities by the end of operation 2 but similar again at the end of operation 3.

In El Salvador, SMI communities implemented new protocols, training, and educational workshops that improved children's health, particularly in terms of weight gain and awareness among mothers. Micronutrient projects expanded beyond just iron and zinc to multivitamins, which contributed to healthier outcomes. The household data is only available for operation 2 and indicates that around 39 percent of children 6-23 months old consumed at least 50 sachets of micronutrients in the previous 6 months. In non-SMI areas, the supply of micronutrients, including iron and Vitamin A, was stable, and efforts were made to increase awareness. Both SMI and non-SMI areas followed the AYEPI protocol for comprehensive childcare, with similar treatment strategies and educational programs.

In Belize, health staff indicated an increase in the consumption of micronutrients in most areas, although challenges persisted with ensuring proper administration of supplements. Community health workers emphasized the importance of a balanced diet, while products like Incaparina were used to mitigate malnutrition where necessary. Despite these reports, quantitative household data shows that no child in the sample consumed 50 or more micronutrient sachets. One case reported consuming 24 sachets, while all others consumed single-digit amounts.

In conclusion, while SMI areas generally implemented more structured programs and reported significant improvements, non-SMI areas were not left behind, with both benefiting from steady supplies and educational initiatives. However, occasional shortages and resistance from mothers presented challenges across all areas.

<u>Deworming</u>. – Health staff in Belize reported that deworming medication is widely available through multiple channels, including local health centers, pharmacies, and sometimes even schools. Household survey data shows an increase in deworming rates from 28.8 percent at baseline to 46 percent by the end of operation 2. According to one interviewee from a health center, the Ministry of Health distributes deworming medication every six months, ensuring a consistent supply. Another respondent highlighted the importance of promoting deworming within communities to normalize it as a routine medical practice, which also helps improve local health center attendance. This community engagement likely contributed to maintaining deworming rates above 40 percent by the end of operation 3.

In most SMI-supported locations in El Salvador, respondents indicated improved coverage of deworming efforts for newborns and children. The quantitative data confirms an increase in deworming rates between baseline and the end of operation 2. The percentage of children receiving deworming medication more than twice in the past twelve months increased from 35.4 to 40.7 percent in that period. Health staff in one community expressed appreciation for SMI's development of a new deworming registry, which streamlined service delivery and ensured a stable supply of medication:

> *"Thanks to SMI, a special deworming registry was maintained, making things easier, and there was generally a good supply through promoters. However, families were also encouraged to visit the health facility."*

Additionally, health workers from a different area mentioned changes to previous guidelines, with the starting age for deworming lowered from two years to one year under SMI's guidance. According to respondents, this shift contributed to a decrease in gastrointestinal diseases. Despite some periods of scarcity, deworming efforts were generally effective, particularly when syrup, instead of pills, was administered to newborns and young children. Despite these positive reports the percentages declined sharply by the end of operation 3, perhaps due to COVID-19 disruptions but we do not have clear evidence of the cause. In non-SMI areas, respondents reported limited supplies and emphasized the role of school-based campaigns in promoting deworming.

In Honduras, health personnel in SMI communities observed an increase in deworming activities for children aged 12 to 59 months between 2015 and 2019. A local health center staff member reported that deworming was administered to children as young as six months old. These activities were supported by annual deworming campaigns, which coincided with National Vaccination Day in May or June. Stakeholders also noted that deworming was conducted in primary schools. The household data, however, shows substantially lower rates at operation 2 and operation 3 measurements than at baseline.

A local health center staff member highlighted SMI's efforts to train personnel on the use of albendazole -and antiparasitic drug- and its field administration. CHWs in one area reported that deworming for children aged two to five occurred during local health center check-ups, campaigns, or upon request during home visits. Children experiencing severe abdominal pain were referred to hospitals for treatment. All health personnel in the region confirmed that they had adequate supplies of deworming medication.

Vaccinations. – Hospital staff in Honduras SMI communities agreed that the vaccination rates in the country have been high for a long time, with no significant changes reported during the operation 2 period. According to the testimonies, the MoH has historically prioritized immunization campaigns. Similarly, health staff in non-SMI areas in Honduras observed no change in vaccination rates from 2015 to 2019, although nurses in those areas conducted outreach activities to reach more patients who needed vaccines. This may explain why our estimates in Table 12 show a small difference in favor of non-SMI areas which were expanding coverage. In Table 13 we show that during the period under study, Honduras had MMR vaccinations rates that were substantially higher than those in Belize and El Salvador, however vaccination was not universal. In all three countries the trend has been positive from baseline to the end of operation 2 and the MMR immunization rate increased.

Consistent with the household survey data reported in Table 13, the LHC staff reported that vaccination rates in El Salvador SMI areas increased in the years before the COVID-19 pandemic, supported by a stable vaccine supply. They described the implementation of vaccination campaigns in certain areas, where health promoters visit mothers at home, educate them, and encourage the vaccination of newborns and children. In SMI areas, vaccines are freely available at health units, and hospitals also began offering them at mothers' request. In contrast, in non-SMI areas, health professionals reported shortages of vaccines from time to time and pointed out to the lack of integration of vaccine schedules between first and second level of care. According to one respondent, there is a plan to integrate the two levels soon, but currently their hospital only provides vaccines in critical cases and does not know the schedule of vaccines delivered by the LHCs in the region.

Health promoters in El Salvador SMI areas have encountered some reluctance among mothers, who fear the effects of vaccines or worry that their children might get sick. However, they noted that these concerns have decreased over time. Some local health center staff mentioned efforts to make vaccines more accessible by conducting home visits and bring services closer to families and foster education to reduce vaccine hesitancy. In Belize, parents' reluctance to vaccines were rooted in social norms, with CHWs noting that some mothers did not want their babies to be seen by people outside the family, or busy vaccination sites.

In El Salvador, new technologies and protocols have been developed to monitor vaccines and promote follow-up consultations. For instance, in one SMI municipality, local health center staff initially created paper-based tools for tracking vaccinations, which were later upgraded to digital instruments. Non-SMI health staff mentioned having vaccination targets in their areas as well.

Similarly, in Belize health staff highlighted that continuous outreach and communication with parents was fundamental in ensuring that vaccines were documented properly. Household survey data shows an increased in the MMR vaccination rate of 10 percentage points, from 47 to 57 percent between baseline and the end of the second SMI operation. Mobile registration by nurses was an important method in recording visits, as was enlisting community members to support education on the importance of documentation. This was especially useful for families who moved around a lot. A hospital health worker explained:

> *"With the aid of the mobiles, we identified more children. We were able to follow the movement of these families with children. The people are very nomad…, before we probably would lose these children, they change address. So, with the outreaches and with the help of the community health care workers, then we were able to identify these children, bring them in. Hence having a larger population who is receiving their complete vaccinations. And they recorded in their cards as well."*

Anemia and Diarrhea. - In addition to the above indicators, the evaluation team collected qualitative information about anemia prevalence in children and home treatment of diarrhea with ORS and zinc.

Across both SMI and non-SMI communities, respondents generally reported that childhood anemia is not common. However, health workers highlighted the challenges of formally diagnosing anemia in children. Blood tests are typically only performed by doctors and are difficult to access because laboratories are often far from local health center. Furthermore, checkups are only conducted if children visibly appear malnourished.

In SMI-supported areas of Honduras and El Salvador, health staff mentioned the introduction of new equipment provided by SMI to help detect anemia. In El Salvador, this included a faster and less invasive procedure using what they described as an "oximeter-type RAD-67 device[18]" to collect blood samples from children. Meanwhile, in Honduras, a pilot project at a health establishment was developed to train staff in the detection of anemia.

> *"The Mesoamerica Initiative did field research with some type of glucometers and identified children with anemia and referred them to the health facility."*

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[18] RAD-67 device from Massimo.

In addition, LHC personnel reported that staff conducted follow-up visits to monitor children diagnosed with anemia, ensuring they received necessary care.

Between 2015-2019, the availability of ORS (Oral Rehydration Salts) and zinc varied across Belize. Some areas had sufficient supplies, while others experienced shortages, leading healthcare staff to prepare solutions themselves. One hospital staff member noted that the rollout of these medications was gradual, with pharmacies usually having enough medication, but healthcare staff often had to dose treatments themselves due to inconsistent availability. Zinc sulfate, in particular, would occasionally run out. Referrals to hospitals and educating parents on sanitation were crucial in managing diarrhea. One CHW emphasized, "We take those cases very seriously and we refer; but also educate the mom in proper hand washing and sensitized them when it comes to the handling, especially proper handling of the baby and also the family members."

In Honduras, SMI communities were well-equipped to treat severe dehydration with ORS, zinc, and intravenous fluids when necessary. They received specific training and benefited from structured support, ensuring consistent care and follow-up. A health worker expressed gratitude, saying, "We were well endowed. Yes. Thank you for the Mesoamerica initiative." Non-SMI areas faced supply challenges and less organized follow-up, impacting treatment effectiveness.

In El Salvador, SMI areas developed protocols for managing diarrhea and rotavirus, emphasizing the use of ORS and zinc. Education for parents and community health workers played a key role. Non-SMI areas also reported good supplies but faced occasional shortages, following established protocols during these times. Treatment plans were based on the AIEPI criteria, which included different levels of care depending on the severity of the child's condition. Efforts to combat diarrhea were also supported by community health workers, who provided educational talks to mothers on dehydration and environmental issues.

Overall, SMI communities were better positioned to manage diarrhea in children due to consistent resources, specialized training, and structured care systems, while non-SMI areas faced more challenges with supply and follow-up care.

Effects of COVID-19 on Life Cycle Services

The COVID-19 pandemic had an impact on maternal and child health-seeking behaviors in Mesoamerica, primarily due to restrictions, limited access to health facilities, and fear of contracting the virus. Many individuals avoided health facilities unless absolutely necessary, leading to delays in antenatal care and interruptions in immunization services for children, for example. In several areas, healthcare staff had to adapt by implementing new strategies or increasing outreach efforts to maintain service access.

In Belize mothers indicated that COVID-19 was a disruptive factor in the decision to seek out antenatal care. They also mentioned worries about the level of hygiene, sanitation and distancing in LHCs. CHWs noted it was difficult for them to perform their duties, especially in terms of facilitating communications between nurses and pregnant women. Respondents

indicated that calling pregnant women over the phone to book their appointments was a way to mitigate this challenge.

Travel restrictions within communities in Belize due to the Covid-19 pandemic were a noted barrier in conducting home visits for neonatal checkups. LHC staff reported that in some districts, despite mothers attending appointments, pediatricians were often absent from centers which made it difficult to obtain timely neonatal care.

> *"After COVID entered there, everything changed. Even the nurses in the centers were afraid [….], that the patients would arrive to their appointments; not even we could get there with them. So, I did feel it a lot, that there was a difference, we did not continue working as before. Because you worked directly with people, you could reach homes with confidence. But then everyone had that fear of COVID, there was a difference."* (Belize, CHW)

According to midwives, women also reduced the number of their visits to the LHC due to fear of COVID-19 and a lack of access to reliable transportation. A health official stated that Belize did not experience a drop in institutional delivery during COVID-19. Women were tested for COVID-19 before being admitted and guided to different locations depending on the results. All were discharged after 12 hours of delivery instead of the standard 24 hours.

The effects of COVID-19 were very similar in Honduras and El Salvador. After some initial resistance from patients regarding health personnel entering their homes and infecting them, hospital workers started conducting home visits and deliveries at home in El Salvador, to improve the patient care – ANC, neonatal, postpartum – that had been lost at the beginning of the pandemic. In Honduras, CHWs in several areas shared that the recruitment of pregnant women in Honduras actually increased during that time, as women were more likely to stay at home and they could reach them.

The COVID-19 pandemic had a large negative effect on vaccination rates in Honduras, where the MMR immunization rate dropped from 90 percent to 74.1 percent between the end of operation 2 and the end of operation 3 as shown in Table 13. In El Salvador, there was also a small reduction of around 3 percentage points. In Belize, local health center staff reported a decrease in mothers bringing their children in for vaccinations because of fear of contracting the COVID-19 virus. One CHW explained that services did not change but appointments were spaced out to avoid crowded waiting areas.

> *"The services were always there. They always continued. Just that appointments were not as frequent as before COVID, but they were given more, for example, time so that they did not all come at the same time."*

Despite these challenges, Belize's MMR vaccination rate continued growing. Table 13 shows a substantial and sustained progress from 47.5 percent at baseline to 57.3 percent at the end of operation 2 to reach 73.3 percent at the end of operation 3.

Finally, the COVID-19 pandemic also affected hospital services. According to a hospital staff interviewee in Honduras, the COVID-19 pandemic complicated the provision of good quality newborn care due to shortages in necessary supplies and medicine.

Treatment heterogeneity

To analyze treatment heterogeneity by poverty level, we estimated separate regressions for households at the bottom 40 percent and households at the top 60 percent of the expenditure distribution, as decided during the design phase of this research. We show the findings in Annex 5. In general, we find that there are only a few minor differences in the treatment effects between the constructed expenditures strata. SMI size effects are similar for the poorest 40 percent and the top 60 percent of the expenditure distribution.

3.2. Components SMI

In this section we analyze the different components that characterized the SMI and their effect on MNCH outcomes. Analysis is based on qualitative data.

Result-Based Financing

According to IDB staff, national incentives initially played an important role in motivating and coordinating actions within the project. However, as the projects progressed, it was outcomes and goals themselves that became the primary drivers in mobilizing stakeholders.

In Honduras, an incentive system already existed at the local level through a decentralized management model of health services. This model focused on improving the coverage, quality, and production of health services. What was innovative about the SMI was the introduction of incentives at the national level. This new approach allowed for the alignment of national goals with local services, creating a performance framework linked to monetary incentives.

Although the economic incentives were not substantial enough to be the sole motivator, they strengthened the existing local systems. At the local level, meeting targets enabled the purchase of essential medical equipment such as ambulances and ultrasounds, which significantly improved service delivery. For governments, this was especially relevant from a reputational standpoint, as they sought to demonstrate their ability to meet the established objectives.

Insights from various stakeholders involved in the SMI indicate that non-financial motivators, such as reputation, are powerful, though harder to measure and replicate. These intrinsic motivators should not be underestimated when designing similar initiatives.

Donor partners also agreed that incentives played a crucial role in making the initiative more serious and in generating a competitive environment between countries, which contributed to the achievement of goals. Although some indicators proved challenging for certain countries, the system was regarded as fair and successful in motivating participants. While there were no punitive consequences for failing to meet targets, the potential to forgo incentives acted as a

motivator. The flexibility in how the funds could be used made them especially valuable, as they were not tightly restricted like other larger, earmarked budgets. Lastly, SMI shows the importance of transparency and external evaluations from the start. These measures tend to enhance credibility and objectivity, which are key to projects' success and their long-lasting outcomes.

Incentives were in general well received by country authorities who acknowledge the system increases motivation. However, a big challenge relates to the ability the countries have to measure whether the indicators were being met. Sometimes it has been necessary to hire NGOs or external institutions to assist the country in monitoring, especially in rural areas where qualified human resources are scarce, creating temporary structures. In some countries, the system of incentives trickled down to hospitals and/or health centers. In some cases, rewards were used to improve working conditions and efficiency, for example acquiring laptops, fans, refrigerators and microwaves for the staff; in other cases, resources were used to buy vehicles to improve access to hard-to-reach communities, ambulances and equipment.

Despite these positive insights, in some countries conditions were objectively too averse to allow an incentive system to work well. For example, in some countries there was high political instability and frequent turnovers in the MoH leadership.

After the end of SMI, the incentive programs were discontinued across countries. In Belize, the National Health Insurance program now includes some form of incentives. Officials in El Salvador stated that they were unable to maintain the incentive system due to insufficient economic resources. In El Salvador, while the incentive system itself has not been sustained, some recognition efforts, such as awarding diplomas for outstanding work, continue at minimal cost.

External Verification and Monitoring

Results-based financing is a funding approach where part of the payment depends on meeting predefined, verifiable targets. Consequently, external measurement of outputs and verification of these targets was a critical component of the SMI.

Interviews with MoH, LHD, and hospital staff member and others revealed that respondents were often unclear about who conducted the measurements and verification, likely because these exercises were not distinctly identified as 'external' or part of 'SMI.' Despite this, some respondents recalled that early challenges with accessing certain communities were addressed with support from local CHWs to build community trust.

Finally, some health staff reported that measurements are still ongoing in certain areas, especially at hospitals in El Salvador and LHDs in Honduras. Although now internal, according to some LHDs, they continue to monitor outcome trends using templates supplied by the SMI technical support team.

Resource Mobilization and System readiness

All respondents acknowledged the critical role of Phase 1 in setting a baseline for the overall operations of the SMI initiative across different countries. However, there was a notable difference in opinions regarding what is a sufficient duration to establish these operations, since timelines ranged between 18 and 24 months.

Donors expressed overwhelmingly positive feedback about Phase 1's effectiveness, highlighting its value in building foundational structures and identifying key challenges. According to one donor, Phase 1 was instrumental in teaching countries how to organize teams, set metrics, and identify target areas, laying a framework of seriousness for future phases. Another respondent from a different donor organization emphasized that this phase helped secure support from multiple organizations, including foundations, health ministries, and the IDB.

In El Salvador respondents emphasized the significance of Phase 1 in improving maternal and neonatal healthcare. A local IDB official noted the importance of establishing systems for policy implementation, especially in areas like anemia treatment. The hiring of 121 healthcare professionals, funded by the initiative, strengthened community health teams and laid the foundation for the next phase. Similarly, respondents in Honduras agreed that Phase 1 was essential for reducing maternal and infant mortality, with the hiring of additional healthcare personnel for maternal and neonatal care. The LHD deemed this phase crucial for the project's success. Officials in Belize highlighted successful negotiations to increase investments in contraceptives, and procuring essential medical equipment, establishing a foundation for future services.

There was a divide on whether the 18 to 24-month timeline was sufficient for Phase 1. Some respondents found it adequate, while others, particularly from the donor organizations, argued that more time was needed for a smoother transition into Phase 2. In Honduras, respondents felt they had adequate time for Phase 1, but noted a learning curve, particularly given the initiative's regional scope. In El Salvador, some officials felt the timeline was sufficient for first-level operations, while others suggested that more time would have allowed for better analysis of factors affecting the population. Finally, in Belize, officials expressed a need for more time to fully implement policies during Phase 1.

Direct Technical Assistance and Training

Respondents gave varied feedback on their experience with TA. Some recalled extensive TA/training, while others felt it inadequate. According to IDB staff the SMI process allowed them to do more follow-up, and that technical assistance was "intense." Another IDB staff said that the SMI TA was "quite broad and quite solid" as well as "very important." In Belize, officials explained that as a result of the TA, they continue SMI processes in their work regularly. They also shared that they still receive TA for meetings as a part of a two-year extension: "*So SMI really is like here with us, even though it ended. And we continue to receive it, we have been blessed to have an extension of two years, but just with technical assistance for meetings.*" LHC staff in Honduras said that the Coaching and Management Diploma they received improved their communication and teamwork. It is important to remember the coaching program started implementation in September 2022. Therefore, while the experiences with the diploma reported to this evaluation were positive, the diploma followed SMI's third operation and none of its

effects should be considered as contributions to any of the intended outcomes pinned in this evaluation.

Other clinic staff also felt that their approach with patients had improved and that their team was more communicative of things needing improvement. One said that as a result of the technical assistance they became better at recognizing symptoms of health issues with babies. One health clinic staff member specified that equipment and testing were available at the same rates before and after the TA. Another claimed that the quality of care improved as a result of the TA.

On the other hand, LHC members in two different locations in El Salvador said that technical assistance was "scarce" and there were "not many" trainings. In Belize a LHD staff member said that staff had varying new levels of knowledge as a result of the SMI technical assistance depending on their role. This respondent also thought that an effect of the TA was that it highlighted the need to continue training more staff.

> *"In terms of TA, it was short, only a couple a year were given and then some things had to be assumed by the management, which was perhaps not the best option."*

In Honduras, officials said that administrative and financial procedures as well as a lack of human resources caused bottlenecks. They said that the time spent defining monitoring indicators and ensuring compliance was another barrier to progress and that the MOH struggled with follow-up. LHD staff also said that *"support of the MOH for the initiative was very little."*

Respondents feedback on training also varied widely. In Honduras, some hospital staff did not recall any training given to improve the capacities of community health workers or midwives. They also stated that they did not participate in the September 2022 Management and Coaching Diploma – provided to LHC staff only – but received training from the MoH in terms of measuring MNCH indicators and managing neonatal and obstetric emergencies like local health center staff. LHC staff in Honduras who recalled the training they received for the Diploma in Management and Coaching said that the training *"taught us how to manage teams, how to work as a team, how to communicate, how to handle conflicts."* As mentioned above, this diploma was delivered in September 2022, succeeding SMI's third operation.

In Belize one hospital staff member and one local health center staff member could not recall any specific training they received as a part of SMI. However, other hospital staff and local health center staff recalled trainings for doctors, nurses, CHW, and midwives on postpartum hemorrhages, preeclampsia, family planning, and using partographs. Another LHD staff member explained being involved in the orientation program for nurses which lasted six weeks and covered emergency and maternity care skills. One LHC staff member in Belize shared that training also now occurs through the Hearts Program which teaches nurses how to check blood pressure and other heart-related tests.

LHC staff in Belize also shared that some MNCH training processes for nurses and midwives still occur in coordination with the MoH to build capacities related to preventing complications during pregnancy:

"We do have processes in place for training. We have ongoing training with the Ministry of Health in different areas in reference to maternal and child health, in which we will train in vaccines, in children, in childcare development…. we have a specific book that we need to train these nurses and doctors in reference to mothers in care, to prevent morbidity and mortality during pregnancy."

Training recalled by LHC staff in El Salvador included MNCH, nutrition and HIV prevention. Several recalled some capacity building being done with the health unit. In contrast, one staff also noted that nurses were *"not trained in maternal care, but only the SMI guidelines."*

Quality Improvement: In general, the direct technical assistance provided by SMI generated an approach to systematically identify areas for enhancement and implementation of sustainable solutions. Different respondents highlighted the importance of fostering a culture of quality improvement (QI) to enhance performance and outcomes at every level. Each country tailored QI to address its specific healthcare challenges, which has led to notable improvements in protocols, monitoring, and community health outcomes.

A representative from a donor organization shared several policies related to hospitalizations that were developed through the SMI in El Salvador that illustrate quality improvement. These guidelines include defining essential quality standards, implementing actionable hospital protocols, and establishing processes to identify, measure, and resolve issues. For example, one protocol mandates checking for postpartum mothers' bleeding, infection, and body temperature changes every 15 minutes. Another policy involves equipping delivery and operating rooms with designated carts containing essential equipment, overseen by a designated staff member to ensure readiness. According to the representative, these structured improvements demonstrate the effectiveness of a QI strategy and document care processes aimed at optimizing outcomes.

In Honduras, a hospital staff member noted that training has provided practical, real-world skills, covering protocols that go beyond typical university instruction. Frequent meetings to review and plan for QI implementation have embedded these practices nationwide. A health department representative reported a reduction in maternal and neonatal mortality rates since QI's introduction, supported by robust self-evaluation and monitoring. Following maternal or neonatal deaths, cases are now reviewed not only by hospital staff but also with community representatives and maternal services personnel to identify causes and prevent future occurrences. Self-monitoring helps identify areas for improvement, allowing teams to implement targeted QI measures and improve indicators.

A representative of one of the donor organizations, reported on the implementation and impact of the Quality Innovation Fund (QIF) in Belize. The QIF stared during the SMI's second phase, operation 2, with a brief continuation into operation 3 before it was halted due to the COVID-19 pandemic. The QIF allocated funding across Belize's health facilities based on workload, population size, and facility needs. This approach supported four hospitals and 16 LHCs in the Northern District, allowing them to establish protocols and infrastructure improvements that continued even after QIF funding ended. For example, funds were used for essentials like air conditioning units, fans, and necessary equipment to improve the healthcare environment for

both staff and patients. Additionally, the QIF funded an "appreciation day," where healthcare workers gathered to strengthen team cohesion.

Beyond direct funding, SMI's influence extended to the Southern region, in Paraguay for example, and other areas outside the primary focus, sharing quality improvement tools and training that helped these regions adopt new monitoring practices.

Belize's QI efforts have also involved clinical standards like regular patient monitoring, HPV testing, and self-testing programs to reduce cervical cancer. Blood tests for sickle cell anemia, a common condition in Belize, are now part of standard protocol for early diagnosis and disease management. An official highlighted challenges in staff continuity due to a high turnover of foreign medical professionals. This rotation often brings language and protocol gaps, impacting care consistency. Nonetheless, strong support networks between the Ministry and facilities have fostered a "trust bond," enabling the Ministry to respond quickly to needs, as seen in the implementation of a COMCARE-like system for COVID-19 vaccine tracking.

Finally, digital tools for patient tracking, initially designed for monitoring deliveries, now cover care from conception to postpartum. Digital records have replaced paper notes in some facilities, facilitating more efficient tracking and reporting. Today, QI continues under Belize's National Health Insurance program, with a focus on ten maternal and child health indicators, further embedding QI in Belize's healthcare infrastructure.

Regional Model

One donor respondent highlighted how aspects of SMI's regional model had ripple effects that boosted the Initiative's effectiveness across countries. They explained that SMI created external dashboards displaying each country's health system's progress toward meeting performance targets. They claimed that these public dashboards' unintended but beneficial outcome was that countries would compete to outperform each other, fostering a "virtuous cycle" where countries continuously worked to improve their performance. In terms of the legacy of the SMI regional model, a government official in Honduras mentioned that SMI has served as a model for the IDB to propose a similar initiative that sets regional targets, which is currently being discussed at the country level.

However, others noted challenges associated with the regional model. For instance, another donor reported each country had distinct health systems, practices, and external evaluators, leading to some difficulties in assessing overall results. They also noted that political instability in some regions complicated efforts, as did variance in the permissions required to change procurement processes compared to traditional ones in government, and engagement levels with LHDs.

Development partners and government officials discussed the utility of the regional purchasing mechanism for critical supply chain inputs for maternal and childcare– *the Consejo de Ministros de Salud de Centroamérica y la República Dominicana* (COMISCA). A development partner reported on COMISCA's efforts to streamline procurement processes through joint purchasing across multiple countries. They explained that during the first and second operations, relatively

smaller countries tried to use COMISCA to organize bulk procurement to supply items designed to benefit families at-large, including rapid tests and nutrition supplements, attempting to leverage collective purchasing power to negotiate better prices.

An official in Belize confirmed that COMISCA predated SMI and is still in operation, with participating countries including Belize, Honduras, Nicaragua, Costa Rice, Panama, and the Dominican Republic. They reported that participating Ministries of Health meet and rotate Chairmanship annually. Committee assignments rotate every six months, with committees on topics including adolescents, environmental health, and water and sanitation. COMISCA's procurement mechanism focuses on pharmaceuticals and that the prices COMISCA negotiates may be higher than prices offered through other donors' comparable procurement mechanisms.

Finally, IDB respondents pointed to coordinated meetings between the SMI countries to share lessons and best practices. This was also confirmed by one donor representative.

3.3. Role if the Inter-American Development Bank

There was a consensus among respondents on the positive impact, effective management, and coordination that the IDB has demonstrated through their commitment to health system strengthening in Mesoamerica. There were, however, acknowledgments of early challenges by IDB staff, particularly related to institutional buy-in and the learning curve for some of the bank's teams. Suggestions included needing a more straightforward information system and maintaining flexibility in timelines and processes. The IDB's ability to provide direct technical assistance quickly was highlighted as a significant strength by non-IDB staff respondents.

IDB staff described their own roles in various ways: as designers, monitors, implementation supporters, and fund administrators of the Salud Mesoamerica Initiative. IDB staff in El Salvador who worked on SMI described the duties of the role as consulting on monitoring and oversight and conducting impact evaluations at the local level in several countries. One staff remarked that the approach of offering personalized technical assistance under SMI was a new way of working for both the IDB and Ministry of Health in El Salvador. IDB staff in Honduras described designing the initiative in the country, supervising the initiative, and supporting SMI implementation including coordinating technical support. IDB staff in Belize explained that IDB was the administrator of funds and thus managed the formal banking structure and planning payments.

An official in Honduras shared that the IDB and Ministry met twice a year for periodic portfolio reviews where they evaluated the use of resources and progress. A LHD staff member in Honduras affirmed that the meetings were twice a year.

Several representatives of donor organizations and a member of the Ministry of Health in El Salvador spoke to the process of negotiating with country officials to establish indicators, describing how the IDB used analytics to set targets and worked effectively to engage

stakeholders. According to multiple respondents, the IDB played a crucial role in negotiating the indicators that would guide the initiative's evaluation metrics, and participants generally appreciated the clarity and structure established by the bank. One donor staff stated in a KII, *"I think the Bank played a fundamental role in these negotiations. I believe that the donors were very satisfied with the role played by the IDB in those negotiations with the countries."* Another donor staff stated, *"It was very positive, it was an extraordinary dialogue that the bank was able to have with the countries to reach agreements, commitments, balance sheets…the role of the bank as an institution and in particular as a leader of the project, I think it was magnificent."* This staff also shared that the IDB's successful establishment of the incentive mechanism has given continuity to the work and *"become a reference for similar initiatives, whether from the bank or from other organizations."* They were very pleased with the role the IDB played in SMI.

Another donor staff described how the IDB's existing relationships, experience, and reputation helped them execute the SMI project. An official in Belize appreciated how the IDB balanced their role in leading the SMI project:

> *"We had a wonderful team from day one and we must thank the IDB for having such a knowledgeable and experience staff that respect the country decisions and guide the country to make the best decisions without feeling that they are imposing on us, and I think that that is very good because certain workers don't understand that."*

Multiple respondents spoke of IDB staff effectively integrating into local contexts, fostering strong relationships and facilitating communication among key stakeholders. The IDB's contributions were generally viewed positively, underscoring a sense of satisfaction among participants regarding the bank's support and structured approach in executing health initiatives across Mesoamerica.

3.4. Sustainability

Sustainability was the most important concern of donors, and one donor stated that it was the weakest element in the design of SMI, and that the initiative fell short of what was desirable. They stated that there were several discussions on how to underpin a sustainable process but "*I am not sure we were able to concretize this*". They shared an anecdote: staff from one community in Guatemala when asked about the vision going forward when the initiative ended said that they hoped another donor would put in resources. This highlighted *"the dependence on external resources, in a permanent way, without a vision of how this [the work] could be done"* and spotlighted the concern of donors about the process of sustainability. Despite this there were some positive aspects since some countries changed regulations and institutionalized actions/processes beyond the target municipalities of SMI.

One donor staff stated the challenges regarding sustainability. First, the intervention was very broad across multiple countries with different health information systems. Second, countries were at different development levels at baseline, and some had political instability causing SMI to face different challenges in collaborating and getting approval from local health authorities. In addition, staff turnover in LHDs and CHWs created "missed opportunities" in sustainability since

there was limited knowledge retention and skills needed to be developed repeatedly. This person also felt that there was insufficient thinking and focus on the determinants of health, and more emphasis on technical intervention. In addition, *"sometimes all the donors were treated as one….and project indicators were not formulated based on donor standards of reporting."* Lastly, *"IDB was good at coordinating and following up, and summarizing what was going on. [But] many times, meetings were cancelled for weeks at a time, and that went on for months."*

Staff from two different donors stated that at times it was frustrating and a challenge to reach agreement between the donors and countries that were going to participate in SMI, regarding the objectives, interactions and governance of the activity. The processes set in place could have been more efficient, but one donor acknowledged that *"it was very necessary to be able to have those rules of the game, those clear indicators to be very transparent* "about the results and have a baseline. The second donor staff said that negotiations on the implementation of the different phases could have been more agile. They also said that even though donors had questions about sustainability and areas for improvement, the balance seemed to be very positive and that the role of the IDB was extraordinary in giving continuity to a decade-long initiative.

Donors felt that the RBF component was essential and innovative in creating clear incentives to achieve the targets of the initiative. The demanding standard of having to achieve all the processes of quality care for fulfilling the target was also considered appropriate, since it created good competition among the eight countries. One donor staff said that RBF was the critical factor that caused them to fund the initiative, since it focused on results and stressed co-responsibility by the country to assign new funding into SMI. It required a commitment to make legal and fiscal changes. A guarantee of sustainability was another important factor.

> *"The system was very positive for the objectives that were being sought with the initiative, it generated many debates, it even generated harsh meetings with the countries at some point, but there was a lot of transparency, and it was very clear what was expected to be able to obtain these awards."*

One donor staff said that it quickly became clear by summer 2020 that the COVID-19 pandemic was an extraordinary health event. It was disruptive to every aspect of life in every country and profoundly so with the health systems since they were under immense stress. *"It would have been inappropriate for us as a development partner to encourage our country partners to be doing anything other than what they deemed necessary to deal with the pandemic."* This donor acknowledged that adjustment in the timeline (extension of operation 3) due to COVID-19 was acceptable in the face of the pandemic as well as *"adjustments to the performance framework, tranches and incentive money that removed the 80% all or nothing into a pay by indicator achievement"* so that progress could be acknowledged.

When asked what could have been done differently, one donor mentioned the original focus on community level engagement which was abandoned when some funding did not materialize. They noted that it is possible to make a certain amount of progress via the political system, but a lot can also happen from pressure from within, from the grassroots.

According to IDB staff assisting Belize *"sustainability is not something that occurs overnight."* They noted that elements that were sustained after the initiative ended were interventions and best practices that had been followed for 8-9 years and became routine due to training of staff in the hospitals. Recent procedures from operation 3 such as preconception care or digital health were more challenging to sustain. IDB staff working with El Salvador also stressed that quality procedures that became a habit continue to be followed. On the other hand, financial incentives are more difficult to sustain. According to an official in Belize, the country continues to implement all the SMI elements except for the quarterly external evaluation since they lack the staff to do this.[19] One key recommendation to other countries starting a similar SMI was to *"establish a quality improvement unit from day one. We did not foresee that, and we ended up at the end of SMI, establishing the quality improvement unit with new staff that did not participate in the entire process."* This respondent also stated that the achievement of all target indicators under RBF was a very strict standard. It could have been simpler with countries committing to achieve up to 3 or 5 indicators. A key sustainability of practice mentioned in Belize by IDB staff was *"the expansion of QI to all hospitals in the country - not just 20 percent of the poorest - in non-communicable diseases."*

Key informants in Belize, El Salvador, and Honduras mentioned that some of the key challenges in sustaining SMI included the lack of monetary resources for equipment or medicines, lack of sufficient personnel (pediatricians, obstetricians, nurses) and turnover or rotation of staff which implied that trained personnel were lost and had to be constantly trained. Respondents in Belize mentioned the lack of sufficient doppler ultrasound machines, neonatal scales, and one-month contraceptives (that were preferred over the 3-month contraceptives which sometimes had side effects). Having only one staff trained in quality assurance was also a problem, because if they were absent the procedures were not followed. The large demand for nurses worldwide also caused many nurses to migrate. One staff from a LHD in Belize mentioned that the initiative originally circulated a modest obstetric triage form with steps that had to be followed. Then a second form was introduced with limited training and hospitals had to use two forms which was a challenge since it created more work for the nurses and included duplicative information. Respondents in El Salvador also cited a decrease in the supply of ORS for children and the inability to replace deteriorating equipment for anemia screening. In Honduras one respondent stated that it could have been easier to sustain practices/processes if the IDB had focused on just 2-3 issues that were problematic. Even though more work was done in normalizing processes, all interventions were not normalized due to changes in the personal of authorities and technicians. Finally, one LHD staff in Honduras mentioned the importance of commitment at the beginning of the initiative, since without this sustainability is very difficult.

> *"The most difficult thing is sustainability. Because when the processes begin, if there is no commitment it is very difficult to maintain sustainability, because to sustain a project you need many factors, whether economic, available resources and more personnel."*

The key lessons and best practices from SMI mentioned by respondents in Belize and El Salvador included the policy on quality improvement. Respondents from Belize also mentioned,

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[19] Monitoring of services was cited as difficult to maintain since it required health staff to be away from their job 15-21 days every quarter when they are monitoring other regions.

improving documentation of processes, and the construction and tracking of indicators. In Belize QI has now expanded into the entire health system not only MNCH. In El Salvador cancer results are still given to patients in less than 8 weeks, a practice that has been sustained from SMI. In Honduras one key respondent noted that antenatal visits with quality was an important SMI focus that had been sustained due to a "concentration of activities" in this area such as training, development of processes and measurement.

IV. Conclusions

The SMI was an ambitious RBF multi-country initiative that achieved varying levels of impact across both countries and indicators, reflecting the diverse contexts in which the initiative was implemented.

SMI fostered a strong emphasis on clearly defined outcomes and their measurement. This focus on clear targets, along with the incentives provided by the RBF approach, triggered the initial efforts, however in some countries motivation to improve MNCH outcomes became the driver to mobilize stakeholders.

Overall, the SMI initiative enhanced the quality of care across countries. The data indicates improvements in antenatal care (ANC), quality care during delivery, newborn care, and the management of obstetric and neonatal complications. These advancements can be attributed to several factors, including comprehensive training, the standardization of procedures, better workspace organization, and the implementation of well-defined protocols. These protocols, which incorporate checklists and forms, helped ensure that essential procedures were consistently followed while minimizing unnecessary steps.

These factors highlight the critical role of the direct technical assistance provided by SMI to participating countries—a component not always included in similar global health aid initiatives-and highlight the importance of the IDB's leadership in administering and coordinating the initiative. This hands-on support emphasized process improvement and facilitated the effective implementation and institutionalization of quality enhancements, even if the sustainability of these advancements varied across contexts.

A key aspect of the coordination efforts was the mobilization of resources during the first SMI operation, which respondents unanimously regarded as critical to improving the quality of health care. This initial phase prioritized investments and efforts towards preparing essential equipment, supplies, medications, and building critical capacities. However, challenges emerged in ensuring consistent resource availability and aligning these efforts with long-term sustainability goals.

The impact of SMI on health coverage indicators exhibits significant variability across countries. For instance, the timeliness and coverage of antenatal care (ANC) differ markedly. In Honduras, there have been notable improvements in the percentage of women attending ANC during the first trimester of gestation and in those completing at least four ANC visits. Conversely, Panama continues to report persistently low levels for both indicators, underscoring disparities in program outcomes. Other countries, like Guatemala showed an improvement relatively to

comparison areas at the end of operation 2, however the levels reached are the lowest in the region.

Some of the challenges we identified relate to cultural norms and privacy concerns of women who do not want their pregnancies to be public in the first months of gestation, financial constraints to access health facilities, and, in some countries, security concerns. Additionally, shortages and high turnover rates of community health workers (CHWs) have further impeded progress. While certain obstacles could be addressed through targeted health initiatives in the future, others—such as pervasive security issues—are structural challenges beyond the scope of SMI's responsibilities.

The SMI has made a meaningful contribution to improving MNCH outcomes among the poorest populations in Mesoamerica, particularly considering the relatively modest investment involved.

Several key features of the initiative were pivotal to its impact and provide valuable lessons for future global health programs. These include: (1) a results-based financing (RBF) model with clear targets and measurements, (2) the provision of direct technical assistance, (3) resource mobilization to strengthen health system preparedness, and (4) the IDB's coordinating and management role, which ensured effective implementation and oversight. Finally, country ownership and sustained commitment emerged as essential factors, strongly influencing the likelihood of success.

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VI. Annexes

Annex 1. Sample sizes by country and survey round

Country	Area	Sample size			
		Baseline	1st follow-up	2nd follow-up	3rd follow-up
Belize	Treatment	HH: 355 HF: 39	HH: - HF: 38	HH: 434 HF: 20	HH: 481 HF: 20
Chiapas (Mexico)	Treatment	HH: 4,993 HF: 60	HH: - HF: 60	HH: 2,078 HF: 60	
	Comparison	HH: 1,953 HF: 30	HH: - HF: 30	HH: 938 HF: 30	
Costa Rica	Treatment	S: 924 HF: -	S: - HF: 38	S 2,124 HF: -	
El Salvador	Treatment	HH: 6,126 HF: 65	HH: - HF: 60	HH: 1,434 HF: 60	HH: 1,141 HF: 36
	Comparison	HH: HF:	HH: - HF:	HH: HF:	HH: 600 HF: 22
Guatemala	Treatment	HH: 4,603 HF: 64	HH: - HF: 60	HH: 2,729 HF: 61	
	Comparison	HH: 1,226 HF: 29	HH: - HF: -	HH: 1,009 HF: 30	
Honduras	Treatment	HH: 1,526 HF: 59	HH: - HF: 60	HH: 1,683 HF: 60	HH: 1,410 HF: 37
	Comparison	HH: 1,445 HF: 31	HH: - HF: -	HH: 756 HF: 30	HH: 598 HF: 22
Nicaragua	Treatment	HH: 1,713 HF: 40	HH: - HF: 60	HH: 2,318 HF: 60	HH: 1,702 HF: 42
	Comparison	HH: 1,097 HF: 24	HH: - HF: -	HH: 1,045 HF: 30	HH: 754 HF: 21
Panama	Treatment	HH: 2,354 HF: 38	HH: - HF: 39	HH: 2,182 HF: 39	

* HH: Households, HF: Health facilities, and S: Schools

Annex 2. Respondent types by country and intervention area

Respondent type	Country		
	Belize	**El Salvador**	**Honduras**
Key Informant Interviews			
IDB	1	2	1
Ministry of Finance	1	0	1
Ministry of Health	1	1	1
Local Health Department Staff	SMI: 2	SMI: 3 Non-SMI: 3	SMI: 3 Non-SMI: 2
Hospital Staff	SMI: 6	SMI: 2 Non-SMI: 3	SMI: 6 Non-SMI: 3
Health Center Staff	SMI: 6	SMI: 6 Non-SMI: 6	SMI: 6 Non-SMI: 3
TOTAL	17	26	26
Focus Group Discussions			
Community health workers	SMI: 3		SMI: 3 Non-SMI: 3
Midwives	SMI: 3		SMI: 2 Non-SMI: 1
Women with children	SMI: 3		SMI: 3 Non-SMI: 3
Partners / family members	SMI: 1		SMI: 1 Non-SMI: 1
TOTAL	**10**		**17**

Annex 3. Results excluding comparison municipalities that were part of the catchment area of a treated higher-level facility

Table 16. Impact of SMI – ANC indicators excluding contaminated municipalities (percentage points)

	Mexico (1)	Nicaragua (2)
A. At least 4 ANC visits by physician or professional nurse		
Op. 2 impact	0.18**	0.12**
	(0.05)	(0.04)
Op. 3 impact		0.01
		(0.05)
N	7340	5103
Mean at Bl	0.57	0.81
B. First ANC in first 12w of gestation or less		
Op. 2 impact	0.04	0.08
	(0.04)	(0.04)
Op. 3 impact		0.03
		(0.07)
N	7249	5060
Mean at Bl	0.40	0.46
C. Quality ANC clinic and labs		
Op. 2 impact	0.13	0.01
	(0.07)	(0.02)
Op. 3 impact		0.00
		(0.03)
N	6684	4772
Mean at Bl	0.38	0.90

Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. Household data. ANC with quality is defined as a binary indicator for having conducted lab tests (urine and blood) and clinical tests (measurements of blood pressure, weight, fundal pressure and fetus heartbeat). ANC with quality indicator defined only for women that had at least once antenatal care visit.

Standard errors in parentheses. Standard errors are clustered at the municipality level.

* p<0.05 ** p<0.01 *** p<0.001

Table 17. Impact of SMI – delivery outcome indicators excluding contaminated municipalities (percentage points)

	Mexico	Nicaragua
	(1)	(2)
A. Institutional Delivery by DR or Pro Nurse		
Op. 2 impact	0.06	-0.02
	(0.07)	(0.03)
Op. 3 impact		0.01
		(0.03)
N	7302	5061
Mean at BI	0.44	0.88
B. Management of obstetric complications		
Op. 2 impact	0.28**	0.04
	(0.08)	(0.15)
Op. 3 impact		0.22
		(0.15)
N	351	938
Mean at BI	0.20	0.30
C. Delivery Care with Quality		
Op. 2 impact	-0.03	-0.12**
	(0.17)	(0.04)
Op. 3 impact		-0.07
		(0.04)
N	552	666
Mean at BI	0.71	0.96

Notes: (1) Institutional Delivery by a doctor or professional nurse (HH data): Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. (2) Management of obstetric complications (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status), complication type, and facility fixed effects. For regressions that include data from operation 3 (columns 6-8) we do not include facility fixed effects because facility identifiers were not available for the that operation. Instead, we included a treatment indicator. (3) Delivery Care with Quality (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status) and health facility classification

Standard errors in parentheses. HH data: Standard errors are clustered at the municipality level. HF data: Standard errors are clustered at the facility level for regressions that do not include operation 3, and the facility-year level for regressions that include operation 3.

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

Table 18. Impact of SMI – postpartum care outcome indicators excluding contaminated municipalities (percentage points)

	Mexico	Nicaragua
	(1)	(2)
A. Postpartum care with quality		
Op. 2 impact	0.21	
	(0.12)	
Op. 3 impact		
N	541	

	Mexico (1)	Nicaragua (2)
Mean at BI	0	
B. Contraception advice given after delivery		
Op. 2 impact	0.13*	-0.03
	(0.06)	(0.05)
Op. 3 impact		-0.03
		(0.07)
N	7340	5103
Mean at BI	0.37	0.80
C. First postpartum check-up within 7 days		
Op. 2 impact	0.01	-0.14*
	(0.06)	(0.06)
Op. 3 impact		0.01
		(0.07)
N	7327	4427
Mean at BI	0.35	0.65

Note: (1) Postpartum Care with Quality (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status). (2) Contraception advice given after delivery (HH data): Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. (3) First postpartum check-up within 7 days (HH data): Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. Standard errors in parentheses. HH data: Standard errors are clustered at the municipality level. HF data: Standard errors are clustered at the facility level for regressions that do not include operation 3, and the facility-year level for regressions that include operation 3.

$* p<0.05 ** p<0.01 *** p<0.001$

Table 19. Impact of SMI – neonatal outcome indicators excluding contaminated municipalities (percentage points)

	Mexico (1)	Nicaragua (2)
A. Management of neonatal complications		
Op. 2 impact	0.02	0.18
	(0.13)	(0.13)
Op. 3 impact		0.36*
		(0.15)
N	290	840
Mean at BI	0.20	0.40
B. Routine Newborn Care with Quality		
Op. 2 impact	-0.50**	0.06
	(0.16)	(0.13)
Op. 3 impact		0.12
		(0.11)
N	414	653

	Mexico	Nicaragua
	(1)	(2)
Mean at Bl	0.14	0.06
C. First Postpartum Check-up for Baby within 7 days		
Op. 2 impact	-0.10	-0.01
	(0.05)	(0.03)
Op. 3 impact		-0.01
		(0.02)
N	4343	3469
Mean at Bl	0.71	0.92

Notes: (1) Management of neonatal complications (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status), complication type, and facility fixed effects. For regressions that include data from operation 3 (columns 6-8) we do not include facility fixed effects because facility identifiers were not available for the that operation. Instead, we included a treatment indicator. (2) Routine Newborn Care with Quality (HF data): Linear probability models controlling for mother's characteristics (i.e., age group, literacy, and marital status) and health facility classification. (3) First Postpartum Check-up for Baby within 7 days (HH data): Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures), and municipality and operation fixed effects. Standard errors in parentheses. HH data: Standard errors are clustered at the municipality level. HF data: Standard errors are clustered at the facility level for regressions that do not include operation 3, and the facility-year level for regressions that include operation 3.

Table 20. Impact of SMI – Children's access to healthcare excluding contaminated municipalities (percentage points)

	Mexico	Nicaragua
	(1)	(2)
A. Micronutrientes consumption of 50 or more sachets		
Op. 2 impact	-0.03	-0.01
	(0.03)	(0.01)
Op. 3 impact		-0.02
		(0.03)
N	2159	1692
Mean at Bl	0.02	0.00
B. Deworming more than twice in last 12 months		
Op. 2 impact	-0.12	-0.03
	(0.10)	(0.07)
Op. 3 impact		-0.13**
		(0.04)
N	5533	4286
Mean at Bl	0.25	0.33
C. MMR compliant According to Card (missing=., no card=0)		
Op. 2 impact	0.02	-0.04
	(0.09)	(0.04)
Op. 3 impact		0.06
		(0.05)
N	5753	4412
Mean at Bl	0.47	0.68

Notes: Results correspond to the average of each (unweighted) country-specific mean. Micronutrients consumption is defined for children 6-23 months old that consumed at least 50 sachets of micronutrients in the last 6 months. Deworming is defined for children between 1 and 6 years old that received at least two doses of medication in the last 12 months. MMR compliance is defined for children between 1 and 6 years old that had received their MMR

vaccinations (measles, mumps and rubella) according to their vaccination card. Linear probability models controlling for children's characteristics (age group, gender and year of birth); mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status); household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures), and municipality and operation fixed effects. Standard errors in parentheses. Standard errors are clustered at the municipality level.

* p<0.05 ** p<0.01 *** p<0.001

Annex 4. Progress in SMI areas – All countries

Table 21. Antenatal care

	At least 4 ANC visits by physician or professional nurse			First ANC in first 12w of gestation or less			Quality ANC clinic and labs		
	BI	Op.2	Op.3	BI	Op.2	Op.3	BI	Op.2	Op.3
Belize	96.4	100.0	84.5	--	--	--	--	--	--
Guatemala	11.9	14.8	--	20.6	21.7	--	11.5	25.8	--
Honduras	71.8	80.9	90.0	50.4	62.5	63.9	89.4	96.7	98.6
Chiapas (Mexico)	53.3	67.0	--	36.8	38.4	--	32.3	57.4	--
Nicaragua	77.1	65.8	69.6	44.5	47.3	52.1	89.6	94.4	94.2
Panama	38.5	30.5	--	31.0	23.7	--	83.1	82.5	--
El Salvador	90.0	88.3	79.2	64.3	61.7	62.6	92.2	98.7	97.9

Note: Household data. Ante-natal care with quality is defined as a binary indicator for having conducted lab tests (urine and blood) and clinical tests (measurements of blood pressure, weight, fundal pressure and fetus heartbeat). Indicator defined only for women that had at least once ante-natal care visit.

Table 22. Delivery care

	Institutional Delivery by DR or Pro Nurse			Management of obstetric complications			Delivery Care with Quality		
	BI	Op. 2	Op. 3	BI	Op. 2	Op. 3	BI	Op. 2	Op. 3
Belize	98.2	96.8	100.0	22.1	33.8	55.6	34.1	98.7	94.8
Guatemala	17.8	27.1	--	12.1	21.9	--	79.8	97.6	--
Honduras	72.5	87.3	95.3	35.7	62.9	65.4	95.3	99.4	100.0
Chiapas (Mexico)	36.9	47.6	--	18.1	24.3	--	72.3	97.3	--
Nicaragua	85.4	82.1	88.8	32.0	45.0	45.7	96.6	93.7	97.6
Panama	--	--	--	--	--	--	78.3	85.4	--
El Salvador	86.9	98.3	96.6	--	4.6	13.7	--	94.9	98.9

Note: The indicator, institutional delivery by DR or Pro Nurse, measures the proportion of women whose deliveries were conducted in health facilities with skilled attendant (medical doctor and/or a professional nurse) based on household surveys. Management of obstetric complications assesses whether women with obstetric complications (sepsis, hemorrhage, severe pre-eclampsia and eclampsia) were treated according to the norm, as reported in health facility surveys. Delivery care with quality was measured by the active management of the third stage of labor, also based on health facility surveys. The indicator specifically tracks whether women were administered oxytocin or another uterotonic following birth.

Table 23. Postpartum care

	Postpartum care with quality			Contraception advice given after delivery			First Postpartum Check-up within 7 days		
	Bl	Op.2	Op.3	Bl	Op.2	Op.3	Bl	Op.2	Op.3
Belize	34.9	26.8	49.2	--	--	--	--	--	--
Guatemala	13.0	37.1	--	14.4	22.5	--	18.2	35.3	--
Honduras	67.5	91.2	81.3	71.5	83.4	85.7	51.0	58.7	54.7
Chiapas (Mexico)	0.0	47.8	--	32.9	39.9	--	34.0	35.8	--
Nicaragua	--	73.8	65.5	78.8	70.0	75.8	59.3	33.3	87.9
Panama	0.0	--	--	29.7	19.0	--	18.3	21.4	--
El Salvador	--	48.6	8.0	78.8	81.8	77.8	62.5	31.2	54.0

Note: Postpartum care with quality measures whether institutional postpartum patients received immediate postpartum care according to the best practices within two hours after birth and at discharge, according to health facility surveys. Contraceptive counseling after delivery and whether the first postpartum check-up occurred within 7 days were assessed through household surveys.

Table 24. Neonatal care

	Management of neonatal complications			Routine newborn care with quality			First Postpartum Check-up for baby within 7 days		
	Bl	Op.2	Op.3	Bl	Op.2	Op.3	Bl	Op.2	Op.3
Belize	23.7	51.4	56.3	30.2	89.9	48.3	--	--	--
Guatemala	14.0	9.6	--	0.0	35.6	--	53.0	71.9	--
Honduras	10.9	42.7	70.1	21.7	74.7	78.8	78.3	74.0	77.5
Chiapas (Mexico)	22.1	35.3	--	17.1	32.3	--	68.7	69.9	--
Nicaragua	39.9	47.4	67.7	7.2	43.7	40.3	90.7	82.6	100.0
Panama	--	--	--	3.3	1.2	--	37.2	57.0	--
El Salvador	--	5.9	39.8	--	89.0	62.6	12.6	65.2	100.0

Note: Management of neonatal complications evaluates whether neonates with birth complications (prematurity, low birth weight, birth asphyxia, or sepsis) were treated in accordance with established guidelines, as reported in heath facility surveys. Routine newborn care with quality assesses whether neonates received immediate neonatal postpartum care according to standards from medical personnel after birth, also based on health facility surveys. The last indicator, first postpartum checkup for baby within 7 days, assesses whether infants received their first postnatal checkup from skilled personnel within 7 days of birth, as reported in household surveys.

Table 25. Children access to health care

	Micronutrientes consumption of 50 or more sachets			Anemic WHO (2011) definition			Deworming more than twice in last 12 months		
	BI	Op.2	Op.3	BI	Op.2	Op.3	BI	Op.2	Op.3
Belize	0.0	0.0	0.0	--	--	--	28.8	46.0	41.4
Guatemala	3.9	10.1	--	49.9	36.3	--	15.9	18.4	--
Honduras	0.2	30.2	0.0	20.8	46.5	25.9	39.4	26.4	27.3
Chiapas (Mexico)	2.3	2.8	--	23.0	39.7	--	25.5	22.7	--
Nicaragua	0.2	0.2	2.6	39.1	43.6	38.4	32.3	31.9	38.6
Panama	0.0	0.0	--	--	--	--	9.1	13.3	--
El Salvador	--	38.7	--	--	--	--	35.4	40.7	21.9

	Treated diarrhea with ORS & Zinc			MMR compliant According to Card (missing=., no card=0)			Full Compliant according to Card (missing=., no card=0)		
	BI	Op.2	Op.3	BI	Op.2	Op.3	BI	Op.2	Op.3
Belize	0.0	15.4	0.0	47.5	57.3	73.3	2.5	1.3	0.0
Guatemala	0.4	9.3	--	78.2	63.7	--	9.8	1.5	--
Honduras	0.0	8.1	10.5	83.6	90.0	74.1	25.1	35.5	35.7
Chiapas (Mexico)	1.0	5.4	--	48.2	66.6	--	9.5	0.0	--
Nicaragua	2.2	6.9	11.6	65.4	62.7	72.0	6.2	13.0	7.0
Panama	0.7	6.7	--	71.2	66.2	--	6.7	0.1	--
El Salvador	4.3	34.4	19.2	67.2	71.1	67.8	20.7	21.4	7.3

Note: Household surveys. Unweighted. Micronutrients consumption is defined for children 6-23 months old that consumed at least 50 sachets of micronutrients in the last 6 months. Deworming is defined for children between 1 and 6 years old that received at least two doses of medication in the last 12 months. MMR compliance is defined for children between 1 and 6 years old that had received their MMR vaccinations (measles, mumps and rubella) according to their vaccination card.

Annex 5. Treatment heterogeneity

To analyze treatment heterogeneity by poverty level, we estimate separate regressions for households at the bottom 40 percent and households at the top 60 percent of the expenditure distribution. Table 24 shows for ANC, delivery, postpartum and neonatal care, and Table 25 shows results for children's indicators. There are only a few minor differences in the treatment effects across the expenditure distribution.

Table 26. SMI impact on lifecycle outcomes by household expenditure level (percentage points)

	At least 4 ANC visits by physician or professional nurse				First ANC in first 12w of gestation or less				Quality ANC clinic and labs			
	Op. 2		Op. 3		Op. 2		Op. 3		Op. 2		Op. 3	
	Bottom 40 (1)	Top 60 (2)	Bottom 40 (3)	Top 60 (4)	Bottom 40 (1)	Top 60 (2)	Bottom 40 (3)	Top 60 (4)	Bottom 40 (1)	Top 60 (2)	Bottom 40 (3)	Top 60 (4)
Op. 2 impact	0.12*	0.05	-0.01	-0.01	0.07*	0.03	0.07	0.05	0.05	0.05	-0.03	0.02
	(0.05)	(0.03)	(0.10)	(0.04)	(0.03)	(0.03)	(0.05)	(0.04)	(0.04)	(0.03)	(0.02)	(0.01)
Op. 3 impact			-0.04	0.04			0.06	-0.04			-0.03	0.01
			(0.08)	(0.05)			(0.07)	(0.05)			(0.03)	(0.01)
N	10015	12051	4389	5555	9780	11841	4334	5501	8720	10852	4107	5329
Mean at BI	0.37	0.45	0.73	0.81	0.29	0.35	0.40	0.50	0.31	0.41	0.88	0.91
	Institutional Delivery by DR or Pro Nurse				**Contraception advice given after delivery**				**First postpartum check-up within 7 days**			
Op. 2 impact	0.02	0.06	0.02	0.01	0.08*	0.04	0.02	-0.03	0.05	0.02	-0.03	-0.11
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.05)	(0.05)	(0.04)	(0.08)	(0.07)
Op. 3 impact			0.02	0.05			-0.03	0.00			0.07	0.05
			(0.05)	(0.04)			(0.05)	(0.08)			(0.06)	(0.06)
N	9985	11951	4361	5499	10015	12051	4389	5555	9972	11979	4316	5528
Mean at BI	0.30	0.45	0.81	0.88	0.29	0.37	0.77	0.80	0.31	0.35	0.62	0.62
	First PostPartum Check-up for Baby within 7											
Op. 2 impact		-0.03	-0.04	-0.10*								
		(0.04)	(0.05)	(0.04)								
Op. 3 impact			-0.00	0.04								
			(0.09)	(0.07)								
N	5449	7243	3128	4169								
Mean at BI	0.69	0.73	0.90	0.89								

Linear probability models controlling for mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status), household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures) and municipality and operation fixed effects. Household data. ANC with quality is

defined as a binary indicator for having conducted lab tests (urine and blood) and clinical tests (measurements of blood pressure, weight, fundal pressure and fetus heartbeat). ANC with quality indicator defined only for women that had at least once antenatal care visit.

Standard errors in parentheses. Standard errors are clustered at the Gestor level for Honduras and the municipality level for the other three countries.
* p<0.05 ** p<0.01 *** p<0.001

Table 27. SMI impact on children's outcomes by expenditure level (percentage points)

	Micronutrientes consumption of 50 or more sachets				Deworming more than twice in last 12 months				MMR compliant According to Card (missing=., no card=0)			
	Op. 2		Op. 3		Op. 3		Op. 3		Op. 2		Op. 3	
	Bottom 40	Top 60	Bottom 40	Top 60	Bottom 40	Top 60	Bottom 40	Top 60	Bottom 40	Top 60	Bottom 40	Top 60
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Op. 2 impact	0.09***	0.03	0.16**	0.09*	0.05	-0.01	0.02	-0.08	0.00	-0.07	-0.01	-0.02
	(0.03)	(0.02)	(0.05)	(0.04)	(0.03)	(0.04)	(0.04)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)
Op. 3 impact			0.01	-0.02			0.06	-0.05			0.05	0.00
			(0.04)	(0.04)			(0.06)	(0.06)			(0.06)	(0.03)
N	3333	3983	1456	1797	8201	9915	3665	4802	8570	10340	3796	4961
Mean at BI	0.02	0.03	0.00	0.00	0.22	0.25	0.27	0.38	0.62	0.64	0.69	0.70

Note: Micronutrients consumption is defined for children 6-23 months old that consumed at least 50 sachets of micronutrients in the last 6 months. Deworming is defined for children between 1 and 6 years old that received at least two doses of medication in the last 12 months. MMR compliance is defined for children between 1 and 6 years old that had received their MMR vaccinations (measles, mumps and rubella) according to their vaccination card. Linear probability models controlling for children's characteristics (age group, gender and year of birth); mother's characteristics (i.e., age group, education, employment status, health insurance status, and marital status); household characteristics (i.e., whether it has piped water, a toilet, uses gas or electricity exclusively to cook, asset Index, owns a vehicle, someone smokes, beneficiaries of a social program and quintiles for household expenditures), and municipality and operation fixed effects. Standard errors in parentheses. Standard errors are clustered at the *Gestor* level for Honduras and the municipality level for the other three countries.

* p<0.05 ** p<0.01 *** p<0.001

Annex 6. Context Mechanism-Outcome Analysis

6.1. Belize: Delivery Care

A Context-Mechanism-Outcome (CMO) configuration is an analytical approach used in Emergent Realist Evaluation (ERE) to identify mechanisms of change in the context in which social actors make decisions, and these processes take place. The configuration is helpful to separate elements of program implementation from the mechanisms (M), which occur independently of the interventions. It also allows researchers to identify contextual elements (C) separately and assess their impact on the mechanisms and the outcomes of implementation (O), either intended or unintended. In the case of maternal and child healthcare, the institutional processes at first and second levels of healthcare, while theoretically independent from any external intervention, can be subject of influence from any new treatment or strategy implemented in the same context in which these mechanisms take place.

The CMO approach dissects these social mechanisms influenced by a treatment or intervention in two: an uptake mechanism in which the treatment is implemented and individuals or groups uptake the resources from treatment. Examples include training sessions, technical assistance, equipment or test provisions. A second moment of the mechanism manifests when recipient individuals or groups *reasons* about the resources received and the context, and assess the relevance and convenience of adopting the treatment as intended or not. Only after this reasoning mechanism takes place, individuals and groups can register use, partial use or lack of use. At all times, individuals and groups make these decisions taking the institutional and social context into consideration. A CMO configuration approach thus helps articulate a theory of change, and its visual depiction in a program logic framework, to examines *what* works, *how*, for *whom*, and *where*.

NORC used this ERE approach to identify the *mechanisms of change* that the obstetrics and neonatology practices experienced at the sample hospitals during the SMI operations. The specific mechanisms we dissect and identify the personnel's uptake of each intervention resource (e.g., AMTSL training, revised guidelines and protocols) and the individuals' reasoning about their learning from the intervention. From there, the CMO configuration also identifies any evidence of use based on these individual and collective learning processes. The CMO configuration approach always pays attention to the role that facilitating factors and challenges in the institutional and social context play on the reasoning mechanisms and therefore, in the use of interventions. The understanding of these robust mechanisms combined with the use of links between intervention and intended outcomes, suggested in theories of change, allows researchers to document logical connections between use and outcomes.

In Belize, NORC used the CMO configuration approach to understand the processes through which hospital staff received, processed, and used the SMI intervention and resources to influence two main outcomes of interest: (1) Delivery Care with Quality and (2) Management of

obstetric complications. According to document review and formative interviews with the technical team, SMI used resources in two main activities with the purpose of improving the quality of delivery care in Belizean hospitals: i) Adjustment and updates to official guidelines and protocols for delivery, neonatal and postpartum care; and ii) training to medical staff on the adjusted guidelines and protocols (partographs, active management of third-stage labor, white boards, stand-up meetings).

Outcomes. Table 26 shows that Belize registered increases in both outcomes between baseline and operation 3. The proportion of institutional deliveries handled by a doctor or a certified nurse increased to almost 100 percent by operation 2, it decreased slightly by the end of operation 3, to 95 percent. In contrast, the increases in the proportion of complications managed was considerably smaller, from 22 to 56 percent between baseline and operation 3.

Herein, we present the CMO analysis of each element of the SMI intervention in Belize related to the delivery lifecycle, according to their contribution to both outcomes, per the initiative's theory of change. Figure 4 in the report summarizes the CMO analysis for the delivery outcomes in Belize.

Table 28. Progress in Delivery Outcomes – Belize

	Baseline	Op. 2	Op. 3
Delivery Care with Quality	0.34	0.99	0.95
Management of obstetric complications	0.22	0.34	0.56

Note: Delivery care with quality was measured by the active management of the third stage of labor, also based on health facility surveys. The indicator specifically tracks whether women were administered oxytocin or another uterotonic following birth. Management of obstetric complications assesses whether women with obstetric complications (sepsis, hemorrhage, severe pre-eclampsia and eclampsia) were treated according to the norm, as reported in health facility surveys.

Element 1. Adjustments to Official Obstetric Care Guidelines

Resource delivery (mechanism). During Operation 1, the SMI team worked closely with Belize's Ministry of Health and Wellness (MHW) to update and complement the official guidelines for hospitals to provide obstetric and neonatal care. According to MHW evaluation participants, the Ministry coordinated with SMI to conduct training on these guidelines and protocols before releasing these guidelines to the hospitals for medical teams to follow them in the maternity wards.

Context. A MHW respondent indicated that by the beginning of SMI, the last review to the obstetric protocols dated back to 2011, suggesting the relevance of their updating and adjustment. NORC obtained information about the protocol and guideline updates to be conducted in collaboration with a team of 20 hospital gynecologists. While not present at technical meetings, the private sector was invited to participate in this process by providing their comments on the guidelines and protocols. The obstetrics care team had started paying attention to quality of care since 2009, not as in-depth as SMI though. So, a MHW respondent reported that while some of these changes faced resistance from some physicians and hospital

staff, a culture of improvement that started 4 or 5 years before SMI helped the teams reduce internal tensions.

Since the adoption of new obstetric and newborn guidelines and protocols, some hospitals have faced challenges to adhering to the adjusted norms and to use the skills staff acquired in SMI training. The main challenges reported have been insufficient inter- and intra-institutional communication about the practical implications of the adjustments, and lack of financial and in-kind resources to implement the adjustments. A hospital staffer shared that their facility has suffered limited availability of resources to adopt new practices and treatments over recent years, explicitly some medications that are part of using guidelines. Another major issue is communication about changes in guidelines and reporting methods; the transition from paper to tablets and the adoption of new monitoring instruments seems to have gone through multiple changes and communication haves not been effective to navigate such modifications smoothly. Another hospital staffer expressed that personnel has felt "demoralized" when they are not aware in advance of the changes to come.

Reasoning (mechanism) and adoption. At the MHW, respondents indicated that the institutional context promoted the adoption of changes by medical staff. On the grounds of such context, respondents suggested that the medical staff had adopted a culture of improvement and innovation from learning from these changes; that the SMI training made it easier for medical staff to adopt the updates and adjustments made to guidelines and protocols. While not all hospital staff respondents explicitly mentioned it, NORC probed that they accepted the guidelines and protocols. Hospital staff also valued these guidelines and protocols as standards to help teams work together and provide better care when adhering to them. The MHW used the experience of updating protocols and guidelines to prepare staff to receive and embrace a culture of quality improvement that came with SMI and the result base plan and framework financing under the Quality Innovation Fund (QIF).

Use. NORC collected the experiences of hospital staff providing delivery care in the maternity room according to the adjusted guidelines and protocols and found no evidence of resistance to use them at the intervention hospitals. According to SMI's theory of change, such use would contribute to increasing the proportion of both the delivery care provided with quality (outcome 1) and the obstetric complications treated according to the norm (outcome 2).

Element 2. Training (Technical Assistance)

Resource delivery (mechanism). Respondents at all surveyed facilities reported receiving training between 2015 and 2020 associated to SMI's second and third operations. Most of them acknowledged the link between these trainings (also called technical assistance) and the adjustments and updates made to obstetrical guidelines and protocols during SMI's first operation. A MHW respondent characterized these trainings as having been focused on skills of interest rather than on a traditional extensive series of contents.

Context. According to several respondents, the MHW and the intervened hospitals organized and continue organizing refresher trainings on obstetrical techniques and competencies frequently, even after SMI ended. According to a MHW respondent, the demand for these

trainings is driven by the practitioners' need; they reported the maternal and child healthcare (MCHC) teams communicate across hospitals, and they stay connected frequently to know of any episode that requires a refresher at any of the hospitals. If there were a maternal death, for instance, the entire MCHC network would communicate to determine what to study or refresh about the topic that concerned that matter. It seems that the medical staff is proactive in preventing another maternal death to occur for the same reason.

Respondents also indicated the MHW, through its National Engineering and Maintenance Center (NEMC), has been providing onsite training on newly acquired equipment for MCHC at the hospitals. Both these practices are conducive to sustaining learning systems among staff who can keep up to date on how to handle new technical equipment at hospitals, promoting better quality in delivery care (outcome 1).

Reasoning (mechanism) and adoption. SMI provided specific training to medical staff to homogenize and increase the effectiveness of the obstetrics practice. Overall, some respondents identified that hospitals now follow a standard practice of triaging all female patients as young as 13 age old that arrive to the facilities, for whatever reasons, and booking those who are pregnant women to the maternity ward for obstetrics assessment independently of their conditions and diagnosis.

As follows, we present CMO results for each training topic as the uptake of resources and the conditions for adherence varied.

2.1. AMTSL Training

Resource delivery (mechanism). Respondents from at least 3 out of the 5 surveyed hospitals reported they received SMI training on obstetric care and neonatal care, and specifically on active management of third-stage labor (AMTSL) between 2015 and 2019, between baseline and operation 2.

Context. Hospital respondents agreed that while deliveries are different every day, they have not faced considerable challenges to follow AMTSL techniques in the maternity wards. A respondent said their team considered the adherence to these protocols part of their routine; another one highlighted how reliable midwives are to monitor mothers and handle labor cases effectively. This respondent elaborated further on the role of midwives in promoting good MCHC beyond AMTSL, guiding mothers on breastfeeding and mother and child bonding. As to the diversity of obstetric cases staff handles daily, a respondent indicated staff at one of the hospitals find in these differences incentives to continue learning about AMTS in practice and improving their results on delivery care with quality (outcome 1) and early identification of delivery complications (outcome 2).

Reasoning (mechanism) and adoption. Overall, all hospital workers interviewed had a positive perception about the advantages of learning and using active management of the third stage of labor (AMTSL). A couple hospital respondents elaborated on the importance of these skills, explaining they learned how to monitor a patient every 15 minutes during the first hour and every 30 minutes during the second hours, and follow the steps – provide oxytocin within

the first minute of birth, clamp cord on a timely fashion, and remove placenta – to reduce and prevent postpartum hemorrhage (pph), and make sure the baby is delivered safely. The reasons why respondents consider AMTSL a valuable tool to prevent complications (outcome 2) and obtain successful deliveries explains the contribution of SMI's technical assistance on these techniques to improving the quality of delivery care (outcome 1).

Use. Overall, all surveyed respondents reported adhering to AMTSL protocols and using the lessons from training. An effective implementation of AMTSL routines is associated with the increase in outcome 1 and the possibility of detecting complication cases to eventually increase outcome 2.

2.2. Partograph Training

Resource delivery (mechanism). Respondents in at least 2 out of the 5 surveyed hospitals said doctors, nurses and midwives received training on how to use partographs.

Context. A hospital respondent indicated that partograph reading has been a widespread practice among midwives and nurses and that the SMI technical assistance were refresher courses for them. However, physicians did not use partographs back then; this technique is not commonly taught at medical school in Belize. All respondents aware of the use of partographs at their facilities reported no challenges in their use.

Reasoning (mechanism) and adoption. At a couple of the intervention hospitals, staff highlighted that learning how to use and read the partograph has been instrumental to track the adequate progress of labor and more importantly, to identify potential complications on a timely basis (outcome 2), so that staff can refer patients at an early stage with a higher likelihood of prevention and control. These teams value the benefits of using photographs and assess the convenience of continuously using them in the future. The comment from a hospital obstetrics staffer illustrates this sentiment:

> *"…having the official training on the use and the reading and the interpretation of the partograph helps us to identify how the labor process is going to identify early risks, or to monitor to see that everything is going well. It allowed us to know when to intervene, when to call specialist, when to transfer, or when to allow for a normal delivery."*

A respondent from another intervention hospital revealed that before the SMI onsite technical assistance, midwives used photographs on a common basis but not the physicians. The training on partographs use and reading motivated physicians to adopt the practice. An emergent outcome of this mutual understanding of the information generated using the partograph has been more synchronicity between physicians and midwives. Therefore, delivery care teams have become better coordinated to assist labor with quality (outcome 1) and make faster and better-informed decisions to handle potential complications (outcome 2). As a hospital obstetrics staffer said – *But now I see some doctors that interpret the partograph and interpret what the midwife is doing; they could say 'okay, yes, it's out of the alert curve, so we need to do something.*

Use. Similar to AMTSL, the vast majority of hospital respondents using partographs in Belize is part of daily routine. Nurses referred that the SMI training convinced many gynecologists and obstetricians who did not use partographs before the intervention and gained the habit of using that equipment after assessing the value of partograph information for improving delivery care (outcome 1) and detecting any potential complications early (outcome 2).

2.3. Remote Therapeutic Monitoring (RTM) Training

Resource delivery (mechanism). While SMI documents indicate technical assistance and equipment for patient RTM were part of the support hospitals received as part of SMI, no hospital respondents expressed being aware of any training contents related to this technique.

Context. The team found limitations in the availability of RTM equipment at hospitals, in addition to the absence of training on their use, according to hospital respondents.

Reasoning (mechanism) and adoption. One hospital respondent acknowledged the positive contributions to more accurately diagnosing mothers, but the analysis did not find evidence of implementation.

Use. Due to a partial resource uptake during delivery, the constraints in the institutional context and the low knowledge and therefore, an imperceptible appreciation about the advantages of their use, their implementation was very limited. This situation provides no evidence of positive influence on outcome 2.

2.4. Management of Whiteboard Training

Resource delivery (mechanism). Perceptions from hospital respondents were limited while staffers at only two facilities recalled the training on whiteboards management for obstetrical care. These facilities also received whiteboards.

Context. At one hospital, staff had used whiteboards since before SMI. At the other facility that reported using whiteboards, staff considers them as a repository to report daily cases in their ward, transfers, and complications; they also use it to indicate and learn who is the staff on duty and team composition. Then same respondent shared that language barriers could impose some challenges to using whiteboards for teamwork and planning, an issue that the respondent said could be circumscribed by allowing non-English speaker to write in Spanish, for example.

Reasoning (mechanism) and adoption. Two hospital respondents identified some benefits from using a whiteboard at the maternity ward, which include identifying what staff is available and what specialists are on call in case of complications, sharing patient information to know the ward's needs of the day, recording the normal deliveries and the transferred patients. Accordingly, *"it gives you an idea when you're coming on your shift of what you're taking over, what you're left, what you're handing over."* One respondent mentioned their team used whiteboard in the health education room of the hospital. However, no respondents were able to describe anything related to the training on using this tool.

Use. Respondents reported a partial use of whiteboards at maternity wards, with some limitations and lack of standardization on their purpose towards teamwork. Therefore, the evidence suggests limited influence on delivery care with quality (outcome 1)

2.5. Stand-up meetings

Resource delivery (mechanism). Respondents from two out of five hospitals surveyed and one local health authority reported the staff at their facilities received training to conduct standup meetings. At both hospitals, they indicated this practice started in 2020, during or immediately after the COVID-19 pandemic.

Context. Hospitals conduct larger regular "core" meetings to which the entire MCHC team attended. A respondent recognized the importance and value of such meetings to learn what is happening with the larger team and to identify department needs and opportunities to collaborate with other departments, depending on the care needs. Overall, one of the local authorities and the hospital located there identified the benefits of having smaller, more frequent, and shorter meetings to satisfy the needs for first-hand information required for daily work routine at the maternity ward.

Reasoning (mechanism) and adoption. A local health authority and a hospital staff respondent identified some benefits from conducting stand-up meetings, including the little challenges of the day, what is needed for the team's performance at the time, and depending on who is in, learn news from other departments. This comment from a hospital staffer captures this sentiment:

> *"So, at that moment, we were identified, okay, we are short of whatever medication, or we got certain things or, you know, who called in sick, who didn't call in sick. So, it was a brief meeting that we had at that moment to see how things will be for that period of time to the next stand-up meeting. And you know, it did orient us a little bit."*

However, some respondents also assessed that standup meetings are not the only way to improve quality of care at the maternity room. Some preferred longer meetings to discuss larger issues in more detail.

No respondents were able to describe anything related to the training on this practice.

Use. Similar to the use of whiteboards, the evaluation found partial use of standup meetings among respondents. Accordingly, their contribution to increasing the instances of delivery care with quality was limited.

2.6. Training on Complication Management

Resource delivery (mechanism). A hospital respondent acknowledged the doctors at that facility were trained in using the tamponade technique with the Bakri balloon and tranexamic acid to control pph, as well as in shock treatment using the anti-shock garment.

Context. Prior to the adoption of these trainings and the updates to the obstetrics guidelines and protocols, pregnant patients that would be admitted to the hospital due to an emergency would not be triaged adequately to the maternity ward, which could lead to delays in handling any complications. Further, a local health authority indicated that the facility in such area had no obstetrician onsite, which imposed a burden on the MCHC having to rely on a specialist remotely to diagnose a patient and agree on the transfer. Further, the health authority reported that by the time of data collection, it had been the longest period since the hospital in that area had had no cases of eclamptic patients.

Reasoning (mechanism) and adoption. Two hospital respondents reported benefits from training on obstetric complications. In addition to acquiring knowledge on how to use medication – magnesium sulfate – to treat seizures during pregnancy, the staff feels more comfortable and gain confidence with the process and their ability to save the lives of the mother and the child. With the changes in the triaging process at hospitals, staff had to adjust the Obstetric Form and program it on the computer at check in to capture pregnancies upon arrival. Those changes in the technical display to assist pregnancies since arrival pushed the medical officers in at least one hospital to rethink the supplying of labor and pph prevention drugs at the emergency room and revise their processes to refer patients with complications to reduce time.

Use. While the evidence is limited in terms of resource uptake and the reflections on the importance of this training came only from two hospitals, the assessment of the training and its context of implementation are conducive to its use and influence outcome 2 positively.

6.2. Honduras: Antenatal Care

A Context-Mechanism-Outcome (CMO) configuration is an analytical approach used in Emergent Realist Evaluation (ERE) to identify mechanisms of change in the context in which social actors make decisions and these processes take place. The configuration is helpful to separate elements of program implementation from the mechanisms (M), which occur independently of the interventions. It also allows researchers to identify contextual elements (C) separately and assess their impact on the mechanisms and the outcomes of implementation (O), either intended or unintended. In the case of maternal and child healthcare, the institutional processes at first and second levels of healthcare, while theoretically independent from any external intervention, can be subject of influence from any new treatment or strategy implemented in the same context in which these mechanisms take place.

The CMO approach dissects these social mechanisms influenced by a treatment or intervention in two: a mechanism or resource uptake in which the treatment is implemented and individuals or groups receive the treatment. Examples include training sessions, technical assistance, equipment or test provisions. A second moment of the mechanism manifests when recipient individuals or groups reasons about the uptake of intervention resources and the context and assess the relevance and convenience of adopting the treatment as intended or not. Only after this reasoning mechanism takes place, individuals and groups can register use, partial use, or lack of use. At all times, individuals and groups make these decisions taking the institutional and social context into consideration. A CMO configuration approach thus helps articulate a theory

of change, and its visual depiction in a program logic framework, to examines *what* works, *how*, for *whom*, and *where*.

NORC used this ERE approach to identify the *mechanisms of change* that the obstetrics and neonatology practices experienced at the sample hospitals during the SMI operations. The specific mechanisms we dissect and identify the personnel's uptake of each intervention resource (e.g., AMTSL training, revised guidelines and protocols) and the individuals' reasoning about their learning from the intervention. From there, the CMO configuration also identifies any evidence of use based on these individual and collective learning processes. The CMO configuration approach always pays attention to the role that facilitating factors and challenges in the institutional and social context play on the reasoning mechanisms and therefore, in the use of interventions. The understanding of these robust mechanisms combined with the use of links between intervention and intended outcomes, suggested in theories of change, allows researchers to document logical connections between use and outcomes.

In Honduras, NORC used the CMO configuration approach to understand the processes through which local health centers (LHC) staff received, processed, and used the SMI intervention and resources to influence three antenatal care (ANC) outcomes of interest and one delivery outcome: (1) Proportion of pregnant women with at least 4 ANC visits by physician or professional nurse, (2) first ANC in first 12 weeks of gestation or less, (3) quality ANC clinic and lab tests, and (4) institutional delivery by doctor or certified nurse (see Table 27 below). According to document review and formative interviews with the technical team, SMI used resources in four main activities with the purpose of improving the quality and coverage of ANC care in Honduran LHCs and increase the coverage of institutional delivery at hospitals: i) Monetary incentives (stipends) to CHWs, ii) adopting the use of a diagnosis clinical form (hoja filtro), iii) community outreach, and iv) training to local staff on rapid tests.

Outcomes. Table 27 shows that Honduras registered increases in coverage of ANC and institutional deliveries, as well as in the quality of ANC clinical and lab rapid tests between baseline and operation 3. The proportion of pregnant women who receive the tests with quality increased almost 10 percentage points to 98.6, and institutional deliveries increased up to 97 percent at the end of operation 3. The coverage of pregnant women who did at least four ANC visits, while increasing by 20 percentage points, it reached 90 percent at the end of the third operation. In contrast, the proportion of pregnant women with the first ANC within the first 12 weeks reached a relatively lower rate, going from 50 to almost 70 percent.

Herein, we present the CMO analysis of each element of the SMI intervention related to the ANC lifecycle in Honduras according to their contribution to the four outcomes, per the initiative's theory of change. Figure 6 in the report summarizes the CMO analysis for the ANC outcomes in Honduras.

Table 29. Progress in ANC Outcomes – Honduras (%)

	Baseline	Op. 2	Op. 3
At least 4 ANC visits by physician or professional nurse	71.8	80.9	90.0
First ANC in first 12 weeks of gestation or less	50.4	62.5	63.9
Quality ANC clinic and labs	89.4	96.7	98.6
Institutional delivery by doctor or certified nurse	77.0	98.0	97.0

Note: Household data. Ante-natal care with quality is defined as a binary indicator for having conducted lab tests (urine and blood) and clinical tests (measurements of blood pressure, weight, fundal pressure and fetus heartbeat). Indicator defined only for women that had at least once ante-natal care visit.

Element 1. Monetary incentives (stipends) to CHWs

Resource delivery (mechanism). While the evaluation could not verify the provision of financial incentives to volunteer community health workers (CHW), the evidence collected suggests their use was effective in almost all LHCs where SMI was implemented. This tool was a one-time incentive LHCs administered to volunteer CHWs for around 300 lempiras ($12.00 USD in 2017) per CHW to participate in training sessions on rapid testing and conduct community visits to monitor women in reproductive age (WRA) and detect pregnancies at an early stage. In addition to the financial incentive, and probably more significant to LHC staff and CHWs was the reputational incentive triggered by competition between CHW teams. Some respondents at LHCs and CHWs narrated how important goals to detect early pregnancies and have pregnant women visiting the LHCs for ANC controls incentivized the teams to follow up with women in their communities, both in person and over the phone.

In one SMI community, LHC staff mentioned midwives and expecting mothers also received a similar stipend in 2017.

Context. While the collegial and financial incentives may have positively influenced the CHW´s engagement, some CHWs and LHC staff recognized they were not a sufficient compensation for the work and time necessary to visit all assigned homes, follow up with WRA, and keep updated lists of expecting mothers to assist them close to delivery and coordinate transportation or emergency services. The incentives, in the context of implementation in which volunteer CHW have to make decisions about the use of their time and avoid opportunity costs was not positive to sustain this model successfully. In some communities, after several months of implementation and shortfalls in collecting accurate information through the clinical forms for WRA follow up (hoja filtro), some LHCs decided to veer strategy and pay external CHWs to conduct the home visits to circumvent the women´s concerns about disclosing their pregnancies in the community.

Reasoning (mechanism) and adoption. Overall, volunteer CHWs expressed enthusiasm and commitment with the goals to detect early pregnancies and monitor ANC visits. Local teams of CHWs and promoters assumed their goals and for some months in Operation 2, home visits were implemented as planned. After some time, volunteer CHW's enthusiasm started wearing out as volunteers were faced with time constraints and other needs of their time.

Use. Therefore, while effective, the results of these incentives are considered partial over time. In consequence, its contribution to early detections of pregnancy (outcome 2) dwindled over time.

Element 2. Adopting the use of a diagnosis clinical form (hoja filtro)

Resource delivery (mechanism). LHC staff, CHWs, and some midwives all agreed in their knowledge of the monitoring clinical form for WRA, also known as "hoja filtro". Respondents received training on its use and some of them narrated their learning progress on how to improve their administration. Protocols indicate al WRA should have their data collected at least every three months and more frequently from pregnant women to follow up on their ANC visits.

Context. Most LHC, CHW and midwife respondents expressed no obstacles to administer the form in most communities. However, there is a fraction of households and communities that have been more resistant to accepting educational content about ANC, institutional delivery, as well as neonatal and postpartum checkups. Some of these communities have strong ties to traditional medicine and rituals that are believed to protect mothers and newborns before and after delivery. Another obstacle for an effective use of the hoja filtro as a monitoring and planning tool is the inability or the fear from WRA to provide accurate information about their last menstrual period and other gynecological information. Their fears mainly originate in not wanting to disclose their pregnancies as they risk being judged by community members if their partners have temporarily migrated or if pregnant women are single. Although most community contexts do not hinder the use of the monitoring clinical

Reasoning (mechanism) and adoption. All LHC staff and CHWs interviewed appreciated the using the hoja filtro. Not only local health teams, but also hospital staff have adopted it for incoming patients. However, some CHW expressed concern with the inaccurate information that they collected from a fraction of WRA who purposefully did not disclose correct information.

Use. While the implementation of the monitoring clinical form for WRA was effective and covered all SMI-treated communities, the wrong or misrepresenting information collected from a fraction of WRA limited the ability of LHC staff and CHW to detect a proportion of early pregnancies, which was crucial to support the attainment of outcome 2. The use of this instrument was more effective in promoting ANC visits among women who had already visited a LHC for their ANC and collect at least four visits (outcome 1).

Element 3. Community outreach

3.1. Regular Pregnant Women Clubs (Club de Embarazadas)

Resource delivery (mechanism). In the communities assisted by SMI where local teams organized this initiative periodically, respondents reported it was successfully implemented. In parallel, the Ministry of Health used time from some of the same CHWs' to organize monthly community meetings to support childcare, under an initiative called "Atención Integral al Niño" (AIN-C), launched before SMI. While that initiative focused on neonatal and childcare, the

monthly meeting were also spaces conducive to disseminate ANC, postpartum, parental control, and institutional delivery messages.

Context. The communities were receptive to the clubs in general. While midwives and CHW organized these spaces for pregnant women and other WRA to learn more about preventing and detecting pregnancy risks early, as well as institutional deliveries and postpartum care, these activities became social spaces in which pregnant women could receive support and guidance as they prepared to become mothers – again or for the first time.

Reasoning (mechanism) and adoption. Several CHWs reported satisfaction with the clubs. While these informal meetings were spaces where WRA seemed more open to listen to CHWs, the testimonial of other women who had delivered at home or at a hospital were some of the strongest elements to persuade pregnant women to do ANC visits and eventually deliver at a hospital. For some WRA, the club was also an opportunity to bring new friends and acquaintances and share information about ANC and postpartum care that these women considered important to disseminate at their communities.

Use. In the communities where the clubs were implemented, CHWs used them to attract WRA in informal spaces. Such outreach contributed to encouraging pregnant women to complete their ANC visits (outcome 1).

3.2. Onsite ANC Modules (selected communities)

Resource delivery (mechanism). LHC staff and CHWs mentioned some ANC modules were implemented in a selection of communities assisted by SMI during operation 2.

Context. Similar to the Pregnant Women's Clubs, having these modules close to home encouraged more pregnant women to visit them. Without the need to travel long distances to the standard LHC, they could receive clinical tests, supplies and a checkup.

Reasoning (mechanism) and adoption. Overall, users expressed satisfaction with the services received and the kindness of staff. However, while not expressed, the logistics to bring an ANC module to a rural community seem onerous and we obtained reports this was only implemented in selected communities.

Use. In the communities where these were implemented, this initiative contributed to attract pregnant women and increase the proportion of those who completed at least 4 ANC visits (outcome 1).

3.3. Home visits for education, ANC follow up and institutional delivery planning

Resource delivery (mechanism). Across SMI communities, LHC staff and CHW teams proudly reported high levels of implementation during operations 2 and 3. The frequency and punctuality of visits varied across communities, but overall, they were carried out covering all target communities. At the household level, the uptake levels varied according to the disposition and attitude WRA and their relatives had towards ANC, institutional delivery and other MCHC

services provides by the public system. Some CHWs included the engagement with the woman's partner as an essential element of the home visits.

Context. While all respondents reported receptive community members that appreciated the information provided, most CHWs and LHC staff indicated that a proportion of communities and households continue being resistant or disinclined to accept MCHC services outside their community or other then traditional obstetric and neonatal methods, including the use of a local healer (curandero). There is also a group of WRA that seem more reluctant to listen to the CHWs and attend the talks at the community, but that have been gradually accepting the visits and the information over time, thanks to the dedication of some CHWs. Some CHWs emphasized the importance of male partners' influence and power over the decisions of their female partners related to ANC visits. Thus, the social context requires engaging with them too.

Reasoning (mechanism) and adoption. LHC and CHW respondents agreed that community visits have been a powerful strategy to educate WRA and their partners not only on the importance of ANC visits, but also on pregnancy risks and a delivery plan. Nevertheless, cultural values that prescribe the use of traditional healing and delivering at home continued limiting the increase in coverage in some target communities and households.

Use. Overall, while important and effective in a large fraction of communities, respondents admit a proportion of households and communities to which the buy in to ANC services has not been materialized. This limits the contribution of this strategy to increase the proportion of pregnant women with at least four ANC visits (outcome 1) and institutional deliveries (outcome 4).

3.4. Transportation and logistical support

Resource delivery (mechanism). According to respondents at LHCs and CHWs located in some communities, the provision of transportation for institutional delivery was very effective in attracting pregnant women and help them decide to deliver at the hospital. However, only a few communities reported being capable to provide this support. In addition to SMI support, respondents in three target communities reported that the Ministry of Health opened a maternity home close to their hospitals between 2015 and 2019. Those homes were able to host a range of 25 to 30 pregnant women for a few days before and after their deliveries at the hospital. These homes arranged the use of an ambulance for such purpose.

Context. While CHWs in three communities reported access to transportation to help pregnant women travel to the LHC for their ANC visits, others indicated that those services are not available at their LHCs, referring to poor state of the vehicles and lack of funds to buy fuel.

Reasoning (mechanism) and adoption. Overall, in the communities where local staff can obtain access for pregnant women to be driven to the hospital, this service was highly valued and considered very effective. CHWs in communities that cannot afford it expressed the desire to get access to similar transportation means.

Use. Due to the limited coverage of these services, their use was partial and so the contribution to outcome 4 (increasing the proportion of institutional deliveries) was also partial.

Element 4. Training to local staff and supply of rapid tests.

Resource delivery (mechanism). All CHWs reported being trained in 2017 not only on how to administer the rapid and clinical tests, but also on recognizing signs of pregnancy and potential risks. LHC staff also indicated that SMI supplied them with these tests and trained their staff on how to administer them.

Context. Access to lab and clinical tests in rural areas found no significant barriers for their administration. User CHW showed openness to use them. However, the communities with resistances to the use of ANC services and to have their pregnancies monitored through the use of the hoja filtro were likely to also be reluctant to using these lab and clinical services. On the supply side, while the equipment and test materials were provided, some LHC staff and CHWs reported temporary shortages during Operation 2. Therefore, the community and institutional contexts were supportive of the adoption and use of these tests to diagnose pregnancies and any pregnancy risks, but their coverage had some limitations.

Reasoning (mechanism) and adoption. Overall, CHWs, LHC staff and respondent WRA expressed appreciation for their access to pregnancy and blood tests without the need to travel long distances to a hospital. Some users reported planning ahead their visits to be some of the first patients the day of their visit. The availability of tests and the quality of care at some LHCs was reported to influence the increase of ANC visits (outcome 1).

Use. Both initiatives were implemented to contribute to increase the proportion of pregnant women with access to the rapid tests with quality (outcome 3). While the training on administering the rapid tests was reported to be very effective to enable the use of tests with users at the LHCs, temporary shortages affected the LHCs ability to provide these tests.