

Salud Mesoamérica Initiative
3rd Operation Measurement (2022)
Household and Health Facility Survey Report
Nicaragua

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Acronyms

BMGF - Bill & Melinda Gates Foundation

CAPI - Computer-assisted personal interview

CSF - Carlos Slim Foundation

EONC - Essential Obstetric and Neonatal Care

ICD - International Classification of Diseases

IDB - Inter-American Development Bank

IHME - Institute for Health Metrics and Evaluation

LQAS - Lot Quality Assurance Sampling

MRR - Medical record review

RBF - Results-based financing

SILAIS - Sistema Local de Atención Integral de La Salud (Local Systems of Integrated Health Care)

SMI - Salud Mesoamérica Initiative

WHO - World Health Organization

Executive summary

Introduction

The Salud Mesoamérica Initiative (SMI) is a regional public-private partnership that brings together Mesoamerican governments, private foundations, and bilateral and multilateral donors with the purpose of reducing health inequalities affecting the poorest 20% of the population in the region. The Initiative focuses its resources on integrating key interventions aimed at reducing health inequalities that stem from the lack of access to quality reproductive, maternal, neonatal and child health services. The Institute for Health Metrics and Evaluation (IHME) is the independent external evaluator for the Initiative.

SMI third operation measurement

The objectives of the SMI survey are to assess whether countries are reaching the performance indicator targets set by the Initiative and to evaluate the results of specific interventions. In Nicaragua, baseline measurement (2013) and second operation measurement (2017) data were collected at households and health facilities in intervention and comparison areas, while the first operation measurement data collection took place at health facilities in intervention areas only (2014). The third operation measurement (2022), which was delayed two years due to the COVID-19 pandemic, was performed at households and health facilities in intervention and comparison areas. The use of health facility and household data collection methods permits the measurement of supply- and demand-side information on the Initiative. The pairing of household and health facility surveys is a defining feature of the evaluation, designed to capture key indicators in a robust and multidimensional manner. The SMI third operation measurement is comprised of three components: a census of households, a follow-up survey of a sample of households with eligible women and children, and a survey of health facilities, including review of medical records. Data collection completed in Nicaragua across all measurements is summarized in Table E.1 and Table E.2.

Table E.1: Summary of health facility data collection, SMI Nicaragua

	Baseline		1st Operation	2nd Operation		3rd Operation	
	Int.	Comp.	Int.	Int.	Comp.	Int.	Comp.
Health facilities	40	24	60	60	30	42	21
Medical records	1,208	487	1,460	1,704	764	Pre-Eval: 721; Eval: 1,353	Pre-Eval: 270; Eval: 549

*Records were reviewed from two periods at the third operation to account for the effects of the COVID-19 pandemic

Table E.2: Summary of household data collection, SMI Nicaragua

	Baseline		2nd Operation		3rd Operation	
	Int.	Comp.	Int.	Comp.	Int.	Comp.
Census	5,697	3,172	8,883	4,014	5,646	2,532
Household	1,295	762	1,851	774	1,414	606
Women	1,720	1,103	2,323	1,047	1,708	762
Children	1,407	818	1,820	738	1,342	552

Summary of results

In Nicaragua, a total of 10 performance indicators were measured at the third operation, four from the household survey and six through health facility surveys or systematic medical record review at health facilities. In total, seven indicators were met (three measured in the household survey and four measured in health facility surveys or systematic medical record review), and three were not met. The performance indicator results of the third operation measurement are summarized in Table E.3 and Table E.4.

Table E.3: Summary of third operation performance indicator results, SMI Nicaragua

Source	Indicator #	Indicator	Indicator Value (%)	CI	Target (%)	Status
Household	I1060	Children (6-23mo) with hemoglobin <110g/L	51.4	(42.3 - 60.5)	43.5	Met
Household	I4030	Skilled postpartum care (10 days)	86.8	(81.7 - 90.6)	90.6	Met
Household	I5020	Complete vaccination for age	52.5	(45 - 59.9)	56.7	Met
Household	I5060	Diarrhea treatment with ORS and zinc	10.7	(7.2 - 15.6)	16.4	Not met
Health facility	I3040	First ANC within 12 weeks	63.4	(57.3 - 69)	58.7	Met
Health facility	I4103	Routine newborn care with quality	40.3	(33.3 - 47.8)	58.7	Not met
Health facility	I4070	Management of neonatal complications	59.5	(52.2 - 66.4)	61.3	Met
Health facility	I4080	Management of obstetric complications	44.5	(38 - 51.2)	69.9	Not met
Health facility	I6005	Cervical cancer screening with quality	76.9	(70.7 - 82.2)	60.0	Met
Health facility	I7500	Use of data for decision-making	93.3	(58.4 - 99.3)	66.0	Met

Table E.4: Summary of third operation intervention and comparison indicator results, SMI Nicaragua

				Intervention			Comparison		
Source	Indicator	Description	Time Period	N	%	CI	N	%	CI
Household	I1060	Children (6-23mo) with hemoglobin <110g/L	Baseline	435	53.9	(48 - 59.7)	243	50.2	(38.7 - 61.7)
			2nd Operation	487	51.3	(44.8 - 57.7)	192	46.8	(37.5 - 56.2)
			3rd Operation	350	51.4	(42.3 - 60.5)	153	48.7	(40.6 - 56.9)
Household	I4030	Skilled postpartum care (10 days)	Baseline	657	60.1	(54.3 - 65.7)	413	74.1	(67.9 - 79.5)
			2nd Operation	874	82.6	(77.6 - 86.7)	338	89.4	(82.5 - 93.8)
			3rd Operation	572	86.8	(81.7 - 90.6)	238	97.6	(94.4 - 99)
Household	I5020	Complete vaccination for age	Baseline	1398	48	(41.8 - 54.3)	795	56.8	(50.9 - 62.5)
			2nd Operation	1802	46.7	(42.1 - 51.3)	733	60.7	(54.7 - 66.3)
			3rd Operation	1331	52.5	(45 - 59.9)	548	66.6	(59.9 - 72.6)
Household	I5060	Diarrhea treatment with ORS and zinc	Baseline	197	1.4	(0.5 - 4.3)	104	6	(2.7 - 12.6)
			2nd Operation	246	6.5	(3.9 - 10.7)	77	9.7	(4.3 - 20.3)
			3rd Operation	184	10.7	(7.2 - 15.6)	60	23.2	(14.6 - 34.7)
Health Facility	I3040	First ANC within 12 weeks	Baseline	106	39.6	(30.6 - 49.4)	73	38.4	(27.7 - 50.2)
			1st Operation	371	29.9	(25.5 - 34.8)	Not measured at 1st operation		
			2nd Operation	389	51.7	(46.7 - 56.6)	178	55.6	(48.2 - 62.8)
			3rd Op. Pre-evaluation	151	63.6	(55.5 - 70.9)	55	69.1	(55.3 - 80.1)
			3rd Op. Evaluation	262	63.4	(57.3 - 69)	97	71.1	(61.2 - 79.4)
Health Facility	I4103	Routine newborn care with quality	Baseline	69	7.2	(3 - 16.6)	12	0	(-)
			1st Operation	184	67.9	(60.8 - 74.3)	Not measured at 1st operation		
			2nd Operation	279	43.7	(38 - 49.6)	120	30.8	(23.1 - 39.8)
			3rd Op. Pre-evaluation	122	40.2	(31.7 - 49.2)	51	17.6	(9.2 - 31.1)
			3rd Op. Evaluation	176	40.3	(33.3 - 47.8)	87	13.8	(7.9 - 23)
Health Facility	I4070	Management of neonatal complications	Baseline	190	40.5	(33.7 - 47.7)	90	37.8	(28.2 - 48.4)
			1st Operation	Not measured at 1st operation			Not measured at 1st operation		
			2nd Operation	283	46.3	(40.5 - 52.2)	128	28.9	(21.6 - 37.5)

				Intervention			Comparison		
Source	Indicator	Description	Time Period	N	%	CI	N	%	CI
			3rd Op. Pre-evaluation	133	60.2	(51.5 - 68.2)	49	44.9	(31.3 - 59.4)
			3rd Op. Evaluation	185	59.5	(52.2 - 66.4)	83	37.3	(27.5 - 48.4)
Health Facility	I4080	Management of obstetric complications	Baseline	204	36.8	(30.4 - 43.7)	75	22.7	(14.4 - 33.8)
			1st Operation	Not measured at 1st operation			Not measured at 1st operation		
			2nd Operation	301	44.9	(39.3 - 50.5)	127	25.2	(18.3 - 33.6)
			3rd Op. Pre-evaluation	131	44.3	(35.9 - 53)	45	24.4	(13.8 - 39.6)
			3rd Op. Evaluation	218	44.5	(38 - 51.2)	84	19	(11.9 - 29.1)
Health Facility	I6005	Cervical cancer screening with quality	Baseline	Not measured at baseline			Not measured at baseline		
			1st Operation	Not measured at 1st operation			Not measured at 1st operation		
			2nd Operation	Not measured at 2nd operation			Not measured at 2nd operation		
			3rd Op. Pre-evaluation	Not measured at 3rd operation pre-evaluation			Not measured at 3rd operation pre-evaluation		
			3rd Op. Evaluation	208	76.9	(70.7 - 82.2)	82	57.3	(46.2 - 67.7)
Health Facility	I7500	Use of data for decision-making	Baseline	Not measured at baseline			Not measured at baseline		
			1st Operation	Not measured at 1st operation			Not measured at 1st operation		
			2nd Operation	Not measured at 2nd operation			Not measured at 2nd operation		
			3rd Operation	15	93.3	(58.4 - 99.3)	8	100	(-)

Key findings

Several indicators showed notable improvement since baseline, especially those measured through medical record review. Progress in household indicators for anemia prevalence, complete vaccination for age, and adequate diarrhea treatment may have been hampered by deferred care-seeking during the COVID-19 pandemic.

Performance on pregnancy and delivery related indicators was mixed; timely first antenatal care visits as measured by medical record review, as well as quality postpartum care as measured by household surveys, increased substantially over the baseline. Improvements in obstetric complications management were less evident; in many cases, lab tests required by the indicator definition were not documented in the medical record. Neonatal complications management improved notably, and while performance on routine newborn care was hampered by a lack of registered examinations for malformations, the overall progress since baseline was nonetheless pronounced.

Two novel performance indicators were introduced at the third operation, the first designed to measure the outcomes of interventions related to cervical cancer screening via medical record review and the second related to

decision-making practices using data at health facilities. Both displayed positive results in their first measurement, suggesting that despite limited time for implementation, a robust system for the adoption of interventions was established in Nicaragua.

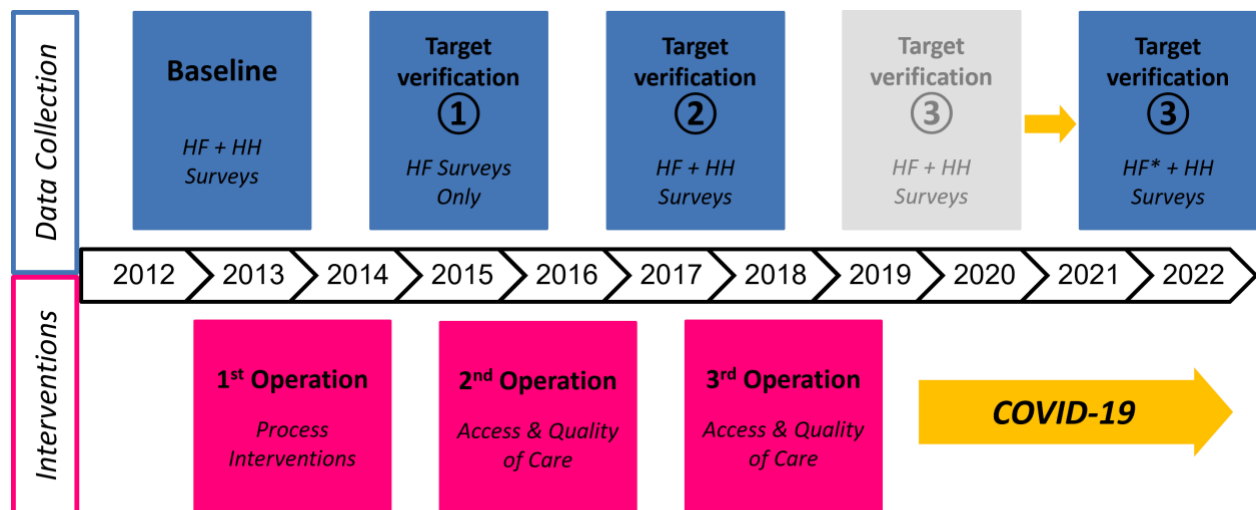
Chapter 1: Introduction

1.1 Overview

The Salud Mesoamérica Initiative (SMI) is a regional public-private partnership that brings together Mesoamerican governments, private foundations and bilateral and multilateral donors with the purpose of reducing health inequalities affecting the poorest 20% of the population in the region. Funding focuses on supply- and demand-side interventions, including evidence-based interventions, the expansion of proven and cost-effective healthcare packages, and the delivery of incentives for effective health services. One of its defining features is the application of a results-based financing (RBF) model that relies on performance measurement and enhanced transparency and accountability. The Initiative focuses its resources on integrating key interventions aimed at reducing health inequalities that stem from the lack of access to quality reproductive, maternal, neonatal and child health services (including immunization and nutrition services) for the poorest quintile of the population.

The objectives of the SMI survey are to assess whether countries are reaching the performance indicator targets set by the Initiative and to evaluate the results of specific interventions. In Nicaragua, baseline (2013) and second operation (2017) data were collected at households and health facilities in intervention and comparison areas, while the first operation data collection took place at health facilities in intervention areas only (2014). The third operation measurement (2022), which was delayed two years due to the COVID-19 pandemic, was performed at households and health facilities in intervention and comparison areas. The use of health facility and household data collection methods permits the measurement of supply- and demand-side information on the Initiative. The pairing of household and health facility surveys is a defining feature of the evaluation, designed to capture key indicators in a robust and multidimensional manner. The timeline of interventions and data collection is shown in Figure 1.1.

Figure 1.1: SMI Nicaragua timeline



* Due to the delay in caused by the pandemic, medical records for the third operation measurement were reviewed from two distinct time periods (2019-mid 2020; mid 2020-2022). This allowed for a comparative analysis of treatment before and during the pandemic as well as through the evaluation period. For more details on medical record collection time periods, see chapter 2.

1.2 Components of the SMI third operation measurement

The SMI third operation measurement is comprised of three components: a census of households, a follow-up survey of a sample of households with eligible women and children, and a survey of health facilities, including review of medical records.

1.2.1 Census survey components

The SMI household census is used to capture the age and sex distribution of all of the usual members of all households in selected segments. Basic information including relationship to the head of the household and marital status is also collected. Children aged 0-59 months who have one or more parent residing in the same household are linked to their mother and/or father by way of unique household member identification codes.

Data from the SMI household census are used to identify and select eligible households for the detailed interviews and the physical measurements module. The household survey is typically conducted within one month of the household census.

1.2.2 Household survey components

The objectives of the SMI household survey are to capture household characteristics, reported maternal and child health data for women 15-49 years of age and for children 0-59 months of age, and anthropometric measurements including height, weight, and hemoglobin concentration for children. Community data collection via household surveys permits the measurement of changes in health status, access to health care, and satisfaction with health care, as well as an array of data points which give context to these factors.

The SMI household survey includes three components: the Household Characteristics Questionnaire, the Maternal and Child Health Questionnaire, and the Physical Measurements Module.

The Household Characteristics Questionnaire collects information on the source of water, type of toilet facilities, exposure to secondhand smoke, ownership of various assets including durable goods, agricultural land, and livestock, and household expenses and sources of health care financing.

The Maternal and Child Health Questionnaire covers eligible women's background characteristics (including education, occupation, and exposure to media), access to health care, current health status, recent history of illness and associated medical expenses, fertility preferences, knowledge and use of contraceptive methods (including barriers to use), and exposure to health system interventions. Women who have been pregnant in the last five years answer questions about birth history; antenatal, delivery, and postpartum care; birth spacing; breastfeeding; and infant feeding practices.

Caretakers of children aged 0-5 years are asked detailed questions for each child under age 5 on topics such as child's current health status, recent history of illness including diarrhea, fever, and acute upper respiratory infection and associated medical expenses, child's exposure to health system interventions, immunization, and supplementation history.

The Physical Measurements Module captures weight, height/length, and hemoglobin concentrations of children aged 0-59 months. Portable scales and height rods were used for the anthropometric measurements and hemoglobin levels were assessed in the field using a portable HemoCue™ machine. Medically trained personnel (i.e., anthropometrists or professional nurses) performed all assessments.

1.2.3 Health facility survey components

The objectives of the SMI health facility survey are to assess facility conditions, evaluate service provision and utilization, and measure quality of care. Patient medical records are examined to evaluate facilities' treatment practices retrospectively over the course of the evaluation period. Health facility data collection aims to capture changes produced by interventions at the level of the health services access point, which may foretell changes in population health outcomes.

The SMI health facility survey includes three components: the Interview Questionnaire, the Observation Checklist, and Medical Record Review (MRR).

The Interview Questionnaire captures information reported by the facility director, manager, or person in charge of the health facility. Data are collected on general facility characteristics, infrastructure, and human resource composition, supply logistics, infection control, child health care, vaccine availability, contraceptive services, and maternal, antenatal, delivery, and postpartum care.

The Observation Checklist captures the surveyors' direct observations of equipment and medications at the time of the survey, and includes the review of administrative records to determine the inventory of certain inputs in the three months prior to the survey.

The MRR assesses a variety of treatment and care practices related to maternal and child health, including obstetric and neonatal complications, routine antenatal care, uncomplicated delivery care, postpartum care, and cervical cancer screening.

1.3 Indicators

The SMI-Nicaragua third operation survey measures indicators defined by IDB and the Nicaragua Ministry of Health (*Ministerio de Salud*). For a subset of these indicators, performance targets were set according to results from previous measurements to evaluate the implementation and efficacy of SMI interventions. Achievement of these performance targets in intervention areas determines the disbursement of the SMI award tranche. These indicators are hereafter referred to as "*performance indicators*" (numeric indicator codes in tables are prefixed with "*I*"). The remaining indicators (hereafter referred to as "*monitoring indicators*", prefixed "*MI*") are defined by IDB and the Nicaragua Ministry of Health for monitoring purposes only and do not contribute to the evaluation of performance targets.

The body of this report focuses largely on the results of these indicators in SMI-Nicaragua intervention areas. For comparable tables detailing the results in comparison areas, see appendix D. Matrices summarizing intervention-area indicator results are provided in appendix A. Detailed definitions of each indicator are provided in appendix B.

1.4 Report tables

Most tables that do not display indicator results take one of two forms. Tabulations of responses for which only one answer was permitted show categories that are mutually exclusive, so the proportions sum to 100%. Counts are shown for non-response (“Don’t know” or “Decline to respond” recorded), but these cases are always excluded from the denominator. Tabulations of continuous variables, where respondents were requested to provide a numeric response, present the range and quartiles (25th percentile, median, 75th percentile) in order to illustrate the distribution of responses across the sample. Counts of non-response are listed in the table and excluded from the count of non-missing cases (N).

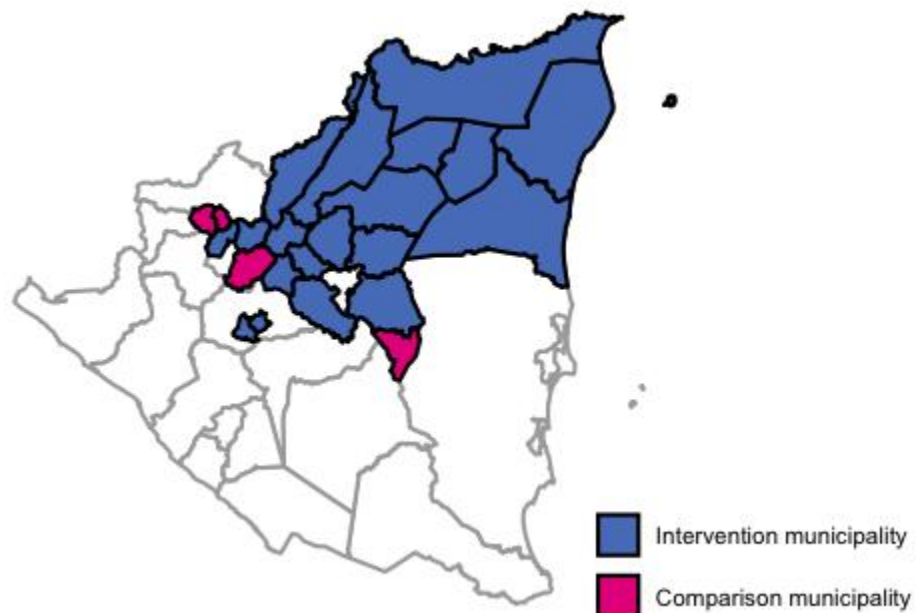
Chapter 2: Survey methodology

2.1 Study area

The study design for the SMI-Nicaragua survey provides representative estimates of the coverage of key health interventions and indicators for a geographic area that approximates the lowest wealth quintile of the population of Nicaragua.

The primary administrative unit in Nicaragua is the department. Nicaragua has 15 departments and two autonomous regions. Five were purposefully selected for SMI in Nicaragua: RACCS, Jinotega, Madriz, RACCN, and Matagalpa. From those five departments, IDB identified 19 intervention municipalities in which to conduct the baseline SMI survey for the Initiative on the basis of their high concentration of residents in the country's lowest wealth quintile, and 4 comparison municipalities with similar socioeconomic characteristics and ethnic composition (Figure 2.1).

Figure 2.1: Map of Salud Mesoamérica Initiative study area



2.2 Household sample selection and description

From the 23 municipalities described above, a two-stage clustered random sample of eligible households was selected to reach the sample sizes shown in Table 2.1.

2.2.1 First-stage sample selection: census segments

The household survey uses a two-stage random sampling design in order to balance survey administration costs with the ability to make estimates representative of the population in the study area. For the SMI-Nicaragua household census, the primary sampling unit (PSU) is the segmento censal (census segment) from the 2005 Nicaragua Population Census. A representative sample of these clusters (“segments”) was randomly selected from a sampling frame of all segments in SMI municipalities with probability proportional to size, where size is measured by the number of occupied households. Samples for intervention and comparison strata, and for baseline and follow-up measurements, were selected independently.

A set of alternate segments was selected using identical methodology, to be surveyed in the event that any of the selected segments could not be surveyed and needed to be replaced due to security concerns, community rejection of the study, or a high proportion of absent households. In Nicaragua during the third operation measurement, the same community was found to have been selected twice in the sample, so a replacement segment was provided in the same municipality. At the baseline, safety issues in the Department of Jinotega and especially in the North Caribbean Coast Autonomous Region (RACCN, Región Autónoma de la Costa Caribe Norte) complicated data collection. Though no personnel were injured, a very threatening event occurred in the RACCN, where interviewers were assaulted, threatened, and tied. In order to avoid becoming an easy target for future violent events in the regions, we were forced to stop activities in that region, and 22 selected segments were not surveyed. Counts by municipality of segments where data collection was completed successfully are shown in Table 2.1.

Table 2.1: Number of segments per municipality in SMI area

Intervention					Comparison				
Department	Municipality	2013	2017	2022	Department	Municipality	2013	2017	2022
Jinotega	Bocay	0	7	5	Jinotega	Jinotega	13	17	16
	El Cuá	3	0	1	Madríz	San Juan del Río Coco	6	3	2
	San Sebastián de Yalí	3	2	2		Telpaneca	6	3	1
	Santa María de Pantasma	5	5	4	RACCS	El Ayote	0	2	1
	Wiwilí de Jinotega	3	6	3					
Matagalpa	Matiguás	3	3	3					
	Rancho Grande	2	2	2					
	San Dionisio	0	1	4					
	Terrabona	1	2	0					
	Tuma - La Dalia	10	2	5					
RACCN	Bonanza	0	3	1					

Intervention					Comparison				
Department	Municipality	2013	2017	2022	Department	Municipality	2013	2017	2022
	Mulukuku	2	1	4					
	Prinzapolka	1	3	0					
	Puerto Cabezas	8	5	2					
	Rosita	1	3	1					
	Siuna	0	6	1					
	Waslala	0	3	3					
	Waspam	0	3	5					
RACCS	Paiwas	2	4	1					

2.2.2 Second-stage sample selection: households

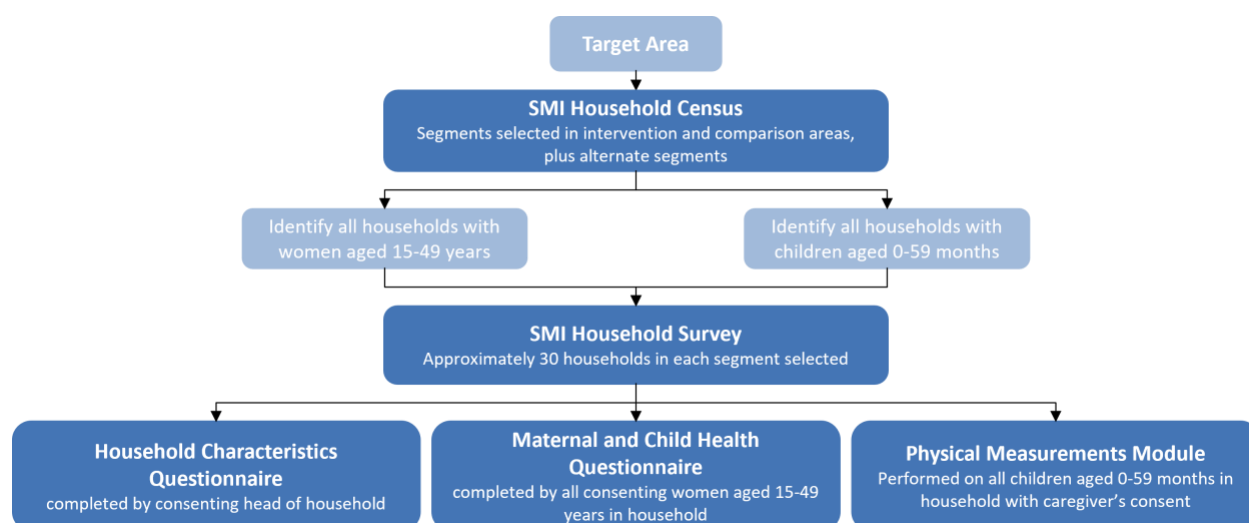
The SMI-Nicaragua third operation household census is conducted in each of the randomly selected segments prior to the household survey in order to identify all eligible women and children for second-stage sampling. Interviewers visit every household in the segment and create a household roster capturing the age and sex distribution of household members.

Eligible households are systematically selected from the complete census listing for participation in the SMI-Nicaragua Household Survey. Thirty households are selected for participation, 25 households with at least one eligible child and five households with only eligible women. In order to ensure at least 30 complete interviews per segment, 10 backup households, eight with at least one eligible child and two with only eligible women, are selected at random in case of refusals or absent households.

All women aged 15-49 years who are members of the selected household are eligible to be interviewed, and all children aged 0-59 months who are members of the selected household are eligible for the physical measurement module. Any household head or other individual knowledgeable about household characteristics and expenditures is permitted to respond to the household characteristics module, while any primary caregiver of a child 0-59 months is eligible to inform for the child health interview module, regardless of sex or age.

A schematic diagram of the survey implementation is shown in Figure 2.2. For a detailed description of household sampling methodology, see appendix C.

Figure 2.2: Schematic diagram of SMI census and household survey implementation



2.2.3 Response rates

The total number of completed interviews with heads of households in the census is shown in Table 2.2, and the total number of completed interviews with heads of households in the household survey is shown in Table 2.3. The total number of women of reproductive age who participated in the household survey for each department in Nicaragua is shown in Table 2.4, and the total number of physical measurements of children aged 0-59 months performed, with corresponding response rates by department, is shown in Table 2.5. Response rates were calculated using the following formula: $(\text{[# surveyed]} \div \text{[# selected participants]})$. High non-response may affect the reliability of the estimates.

Table 2.2: Households participating in the SMI census and response rates, by department

	No. segments			No. households			No. households eligible			No. households censused			Census response rate, %		
	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.
Jinotega	26	37	31	3,641	6,354	4,433	3,484	5,942	4,003	3,414	5,831	3,857	98.0	98.1	96.4
Madríz	12	6	3	1,625	917	335	1,566	898	299	1,555	894	285	99.3	99.6	95.3
Matagalpa	16	10	14	2,124	1,433	1,856	2,089	1,384	1,650	2,061	1,373	1,596	98.7	99.2	96.7
RACCN	12	27	17	1,712	4,433	2,419	1,666	4,093	2,217	1,634	4,036	2,165	98.1	98.6	97.7
RACCS	2	6	2	209	814	330	207	768	283	205	763	275	99.0	99.3	97.2
Intervention	43	61	47	5,918	9,572	6,476	5,775	8,970	5,797	5,697	8,883	5,646	98.6	99.0	97.4
Comparison	25	25	20	3,393	4,379	2,897	3,237	4,115	2,655	3,172	4,014	2,532	98.0	97.5	95.4

Table 2.3: Households participating in SMI household survey and response rates, by department

	No. households selected			No. households interviewed			Household response rate, %			Overall response rate, %		
	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.
Jinotega	830	1,203	977	799	1,138	939	96.3	94.6	96.1	94.3	92.8	92.6
Madríz	381	184	94	364	184	90	95.5	100.0	95.7	94.9	99.6	91.3
Matagalpa	506	313	432	483	303	420	95.5	96.8	97.2	94.2	96.0	94.0
RACCN	417	845	530	364	815	510	87.3	96.4	96.2	85.6	95.1	94.0
RACCS	61	188	65	60	187	61	98.4	99.5	93.8	97.4	98.8	91.2
Intervention	1,396	1,908	1,462	1,300	1,853	1,414	93.1	97.1	96.7	91.9	96.2	94.2
Comparison	799	825	636	770	774	606	96.4	93.8	95.3	94.4	91.5	90.9

Table 2.4: Women participating in SMI women's health and/or pregnancy interview, by department

	No. women eligible			No. women interviewed			Woman response rate, %			Overall response rate, %		
	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.
Jinotega	1,190	1,503	1,224	1,095	1,482	1,132	92.0	98.6	92.5	86.8	91.5	85.6
Madríz	548	228	110	511	226	106	93.2	99.1	96.4	88.5	98.7	87.9
Matagalpa	692	370	565	653	369	509	94.4	99.7	90.1	88.9	95.8	84.7
RACCN	544	1,040	681	479	1,027	645	88.1	98.8	94.7	75.4	93.9	89.0
RACCS	86	269	91	85	268	78	98.8	99.6	85.7	96.3	98.5	78.2
Intervention	1,860	2,349	1,835	1,720	2,325	1,708	92.5	99.0	93.1	85.0	95.2	87.7
Comparison	1,200	1,061	836	1,103	1,047	762	91.9	98.7	91.1	86.8	90.3	82.8

Table 2.5: Children participating in SMI child health interview and/or physical measurements by department

	No. children eligible			No. children participated			Child response rate, %			Overall response rate, %		
	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.
Jinotega	883	1,140	905	863	1,132	875	97.7	99.3	96.7	92.2	92.2	89.5
Madríz	399	170	75	391	170	73	98.0	100.0	97.3	93.0	99.6	88.8
Matagalpa	541	278	385	538	278	368	99.4	100.0	95.6	93.7	96.0	89.9
RACCN	371	804	517	363	800	509	97.8	99.5	98.5	83.8	94.6	92.5
RACCS	70	175	67	70	173	64	100.0	98.9	95.5	97.4	97.7	87.1

	No. children eligible			No. children participated			Child response rate, %			Overall response rate, %		
	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.	BL	2nd Op.	3rd Op.
Intervention	1,422	1,825	1,372	1,407	1,818	1,338	98.9	99.6	97.5	90.9	95.8	91.9
Comparison	842	742	577	818	735	551	97.1	99.1	95.5	91.7	90.7	86.8

2.3 Health facility sample selection and description

2.3.1 Health facility sample

For this survey, a sample of 42 intervention-area health facilities was selected from a list of all facilities serving the 19 SMI intervention municipalities. In addition, 21 comparison-area health facilities were selected from the corresponding 4 comparison area municipalities. The list of facilities was constructed according to a referral network outlined by the Nicaragua Ministry of Health. Facilities are grouped according to three levels of Essential Obstetric and Neonatal Care (EONC) services provided: ambulatory, basic, and complete. Ambulatory facilities provide outpatient care, basic facilities are able to attend uncomplicated deliveries and provide immediate emergency obstetric and neonatal care, and complete facilities have surgical capacity in addition to the services above and have capacity to attend complicated deliveries.

All 33 basic and complete facilities (22 intervention and 11 comparison area facilities) in the study area are included in order to ensure sufficient sample size for the medical record-derived indicators relating to delivery and postpartum care. To complete the facility sample, a stratified random sample of 30 ambulatory facilities (20 intervention and 10 comparison area facilities) is taken, where 50% are facilities visited in previous measurements and 50% are facilities not visited in previous measurements.

Two backup facilities per municipality are selected in case sampled facilities cannot be interviewed due to security or logistic concerns. In Nicaragua during the third operation measurement, two ambulatory facilities that were originally selected were found not to exist upon visiting the communities. These facilities were replaced with the ambulatory facilities in each community where community members reported actually receiving care.

2.3.2 Sampling for medical record review

To complete the medical record portion of the survey, records of care conducted during the evaluation period are randomly selected according to the level of services provided at the facility. Quotas of each type of medical record collected are determined according to the number of applicable facilities within the study sample in order to reach a set total sample size of records for each review module. Records of antenatal care were evaluated in all facilities. At ambulatory facilities, routine attention records for women aged 25-64 were evaluated for the presence and quality of cervical cancer screenings. Records of delivery, postpartum care, maternal complications and neonatal complications were evaluated at the basic and complete facility level.

Medical record review quotas are set per facility by dividing the total number of records to be reviewed in intervention and comparison areas by the number of facilities in the sample at each level of EONC. Quota calculations take into account the prevalence of each type of record as measured in the SMI baseline, first, and

second operation surveys, as well as the statistical power necessary to detect projected differences from baseline through the third operation for performance indicators measuring SMI interventions. Cases of obstetric and neonatal complications were sampled at random from Ministry of Health registries and, if required, additional cases were sampled using a systematic sampling technique in-facility. For the remaining medical record modules, cases were sampled from attention logs and registries using a systematic sampling technique in-facility.

The COVID-19 pandemic and the subsequent delay of the third operation measurement posed significant challenges to the the sampling and evaluation of medical records related to SMI interventions. Routine medical services such as antenatal care, child health care, and vaccination were greatly reduced during the third operation evaluation time period, and the strain on health systems caused by the pandemic impacted record keeping practices. Additionally, the timing of the pandemic called into question the capacity of medical records to accurately evaluate interventions implemented before the onset of COVID-19.

To address these challenges and capture a more complete picture of the pandemic’s impact on health care practices, medical records for the third operation measurement were reviewed from two distinct time periods. One third of the overall medical record quota was allocated to the time period from January 1, 2019 through June 30, 2020 (hereafter referred to as the “pre-evaluation period”). While these records do not contribute to the calculation of performance or monitoring indicator results, they allow for a comparative analysis of indicator performance before and during the pandemic. The remaining two thirds of the overall medical record quota were allocated to the time period from July 1, 2020 through June 30, 2022 (hereafter referred to as the “evaluation period”). This two year window directly preceded the third operation data collection, aligning with the standard evaluation practice of the previous study operations.

An overview of health facility data collection is displayed in Table 2.6.

Table 2.7: Summary of health facility data collection

	Baseline		1st Operation	2nd Operation		3rd Operation	
	Int.	Comp.	Int.	Int.	Comp.	Int.	Comp.
Health facilities	40	24	60	60	30	42	21
Medical records	1,208	487	1,460	1,704	764	Pre-Eval: 721; Eval: 1,353	Pre-Eval: 270; Eval: 549

2.4 Survey implementation

2.4.1 Data collection instruments

Questionnaires were initially developed in English, and then translated to Spanish during the baseline measurement. To best reflect the issues most relevant to the region under study and the local language, the Spanish-language questionnaires were revised following input from key stakeholders before each subsequent measurement round.

All surveys were conducted using a computer-assisted personal interview (CAPI). For the third operation measurement, the CAPI was programmed using SurveyCTO and installed onto touch-screen tablets. CAPI supports skip patterns, inter-question answer consistency, and data entry ranges. The aim of introducing CAPI to the field was to reduce survey time by prompting only relevant questions, maintain a logical answering pattern across different questions, decrease data entry errors, and permit rapid data verification.

2.4.2 Training and supervision of data collectors

Training sessions for the third operation survey were conducted in Nicaragua in July 2022. Five doctors and nurses were trained to conduct the health facility surveys. For household and census data collection, 15 surveyors, eight supervisors, and nine anthropometrists were trained. All surveyors underwent a week-long training, which included three days of in-classroom instruction and practice of interview application. Teams were split into their respective groups and given in-depth training and practice for each relevant component of data collection. The training included content review of each survey, proper conduct of the survey, in-depth review of the instrument, research protocols, ethical considerations, and hands-on training on the CAPI software.

Household surveyors participated in a two-day pilot data collection exercise in communities that were not selected to be part of the SMI sample, where they applied the census and household survey. Health facility surveyors participated in a two-day pilot at health facilities of different EONC levels where they applied the questionnaire, conducted observation exercises, and practiced medical record sampling and review. Representatives from IHME, IDB, and the Nicaragua Ministry of Health provided oversight during pilot exercises.

IHME held debriefing and re-training sessions with surveyors post-pilot and provided continued training during the first week of data collection in sampled communities and health facilities.

2.4.3 Data collection, management, and analysis

In Nicaragua, the SMI health facility survey, including the Interview Questionnaire, the Observation Checklist, and Medical Record Review, was conducted between August 25, 2022 and November 1, 2022.

The third operation household census, which captures basic demographic characteristics of all usual household occupants, was carried out between August 4, 2022 and October 12, 2022.

Data collection for the third operation household survey began on September 6, 2022, and was completed on November 5, 2022. To ensure completeness of the sample, field staff were instructed to conduct up to three visits to selected households (on different days, and at least once on a weekend) in an attempt to complete the Household Characteristics Questionnaire, the Maternal and Child Health Questionnaire, and the Physical Measurements Module. Households that refused to participate or were absent at all three visits were substituted with randomly selected alternates.

Data collection teams, consisting of one supervisor and three to five interviewers were deployed to conduct the SMI household census and the SMI household survey. Supervisors were responsible for reviewing questionnaires for quality and consistency prior to departing to each segment. Doctors and nurses were deployed to conduct interviews, observations, and medical record review at health facilities.

Data were collected using touch-screen tablets equipped with CAPI software. Field team leaders monitored the implementation of the survey and reported feedback. Data collection using CAPI allowed data to be transferred instantaneously once a survey was completed via a secure connection to IHME. Modifications based on suggestions and surveyor feedback were incorporated into the instruments and readily transmitted to the field.

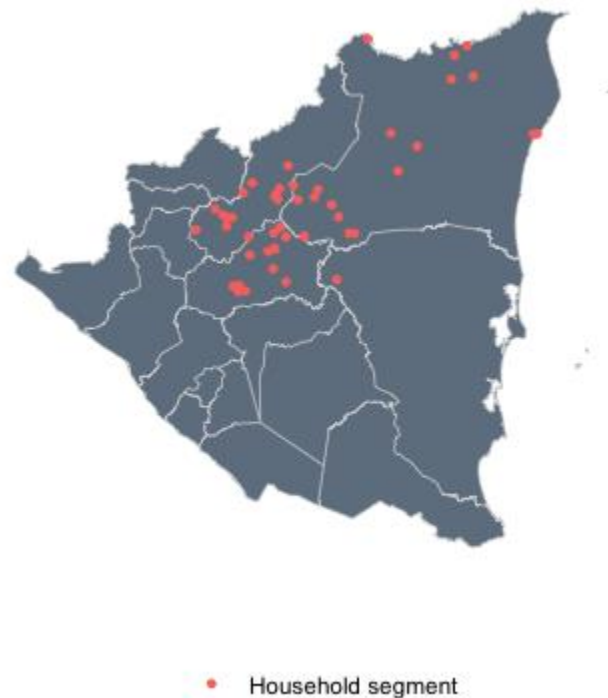
IHME conducted real-time monitoring of incoming data throughout the duration of the survey, providing feedback and guidance to data collectors in the field. Any discrepancies and errors were identified at IHME using bespoke quality assurance programs and subsequently resolved through continuous correspondence with the field team. Progress towards sample quotas was also monitored in order to strategize and adapt to logistical challenges.

Data analysis was conducted at IHME using R version 4 and STATA version 17. Performance and monitoring indicators were calculated at IHME following indicator definitions provided by IDB.

Chapter 3: Household survey results

This chapter provides a descriptive summary of the basic demographic, socioeconomic, and environmental characteristics of the households sampled in intervention areas for the SMI-Nicaragua baseline, second, and third operation household surveys. At the third operation household interviews were conducted in 47 segments across 17 municipalities in intervention areas, shown here in Figure 3.1.

Figure 3.1: Map of household intervention segments in the Nicaragua third operation



3.1 Household characteristics

3.1.1 Characteristics of participating households

A total of 1,414 households in the Nicaragua third operation completed the household characteristics questionnaire. In the baseline, 1,295 completed the survey, and in the second operation 1,851 completed the survey.

3.1.2 Age and sex composition, SMI census

The unweighted distribution of the de facto household population in the surveyed households in the SMI-Nicaragua household census by five-year age groups and by sex is shown for baseline (Figure 3.2) and third operation (Figure 3.3). Nicaragua has a larger proportion of its population in the younger age groups than in the older age groups. Figure 3.3 indicates that in the third operation, just over 35% of the population is under age 15,

more than half (60%) of the population is in the economically productive age range (15-64), and the remaining 5% is age 65 and above.

Figure 3.2: Age and sex of census sample, unweighted percent distribution of de facto household population by five-year age groups, baseline survey, intervention

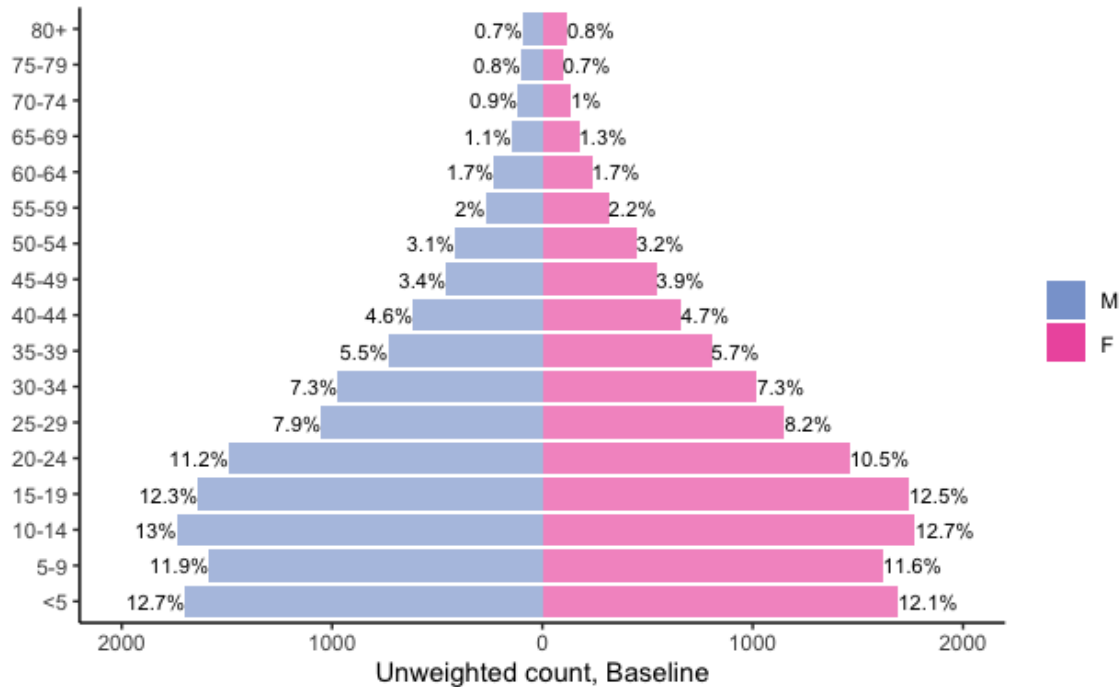
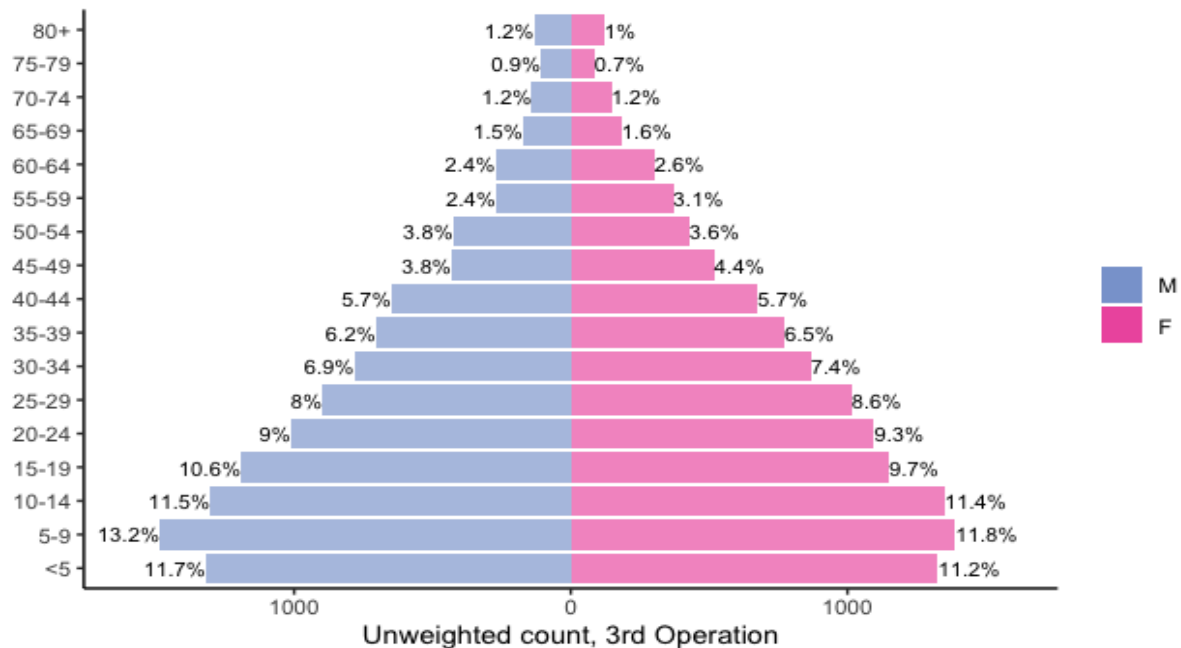


Figure 3.3: Age and sex of census sample, unweighted percent distribution of de facto household population by five-year age groups, third operation survey, intervention



3.1.3 Household characteristics, SMI household survey

The number of households, women and children in the sample are displayed in Table 3.1; and the percent distribution of households by head of household and number of usual members are shown in tables Table 3.2 and Table 3.3 respectively.

Sixty-three percent of households in Nicaragua identify as dual-headed in the third operation. Males are the head of the household in 7.9% of surveyed households in Nicaragua, with females as the head of household in the remaining 28.8% (Table 3.2). The median household size in Nicaragua is four members, with another 25% of households having six or more members (Table 3.3).

Table 3.1: SMI household survey sample sizes: number of total households, women 15-49 years of age, and children 0-59 months, intervention

	Baseline	2nd Operation	3rd Operation
Households	1295	1851	1414
Women	1720	2323	1708
Children	1407	1820	1342

Table 3.2: Household characteristics, SMI household sample, intervention

	Baseline			2nd Operation			3rd Operation		
	n	%	CI	n	%	CI	n	%	CI
Dual-headed household	966	72.2	(67.4 - 77)	1,441	76.7	(72.8 - 80.5)	937	63.3	(59.3 - 67.4)
Single head, female	260	22.6	(18.6 - 26.6)	348	19.7	(16 - 23.3)	370	28.8	(24.2 - 33.4)
Single head, male	69	5.2	(3.4 - 7)	62	3.6	(2.4 - 4.9)	107	7.9	(5.9 - 9.9)

Dual-headed households are those where (a) two individuals were identified as "head" by the respondent or (b) both the person identified as "head" and his or her spouse or partner are household members.

Table 3.3: Number of usual household members, SMI household sample (percentiles)

Operation	N	DK/DTR	Minimum	25th Percentile	Median	75th Percentile	Maximum
Baseline	1,295	0	1	4	5	6	18
2nd Operation	1,851	0	1	3	4	6	19
3rd Operation	1,414	0	1	3	4	6	18

DK/DTR = Number of 'Don't know' and 'Decline to Respond' responses.

3.1.4 Household expenditures

Households were surveyed about the amount of money spent over the last month. After reporting total household expenditures, households were then asked how much was spent on specific categories (e.g., food, housing, education, and medical care) over the last four weeks. Table 3.4 shows the itemized monthly expenditure per person living in the household summarized by expenditure quintile. All data are presented in nominal Córdoba (C), with no adjustment for inflation. Itemized expenditure information was sufficiently complete to report for 1,203

households at the third operation. The lowest quintile in the study area spent less than 656 C per person over the last month in the third operation.

Table 3.4: Total itemized per-capita expenditure quintiles, nominal Nicaragua Córdoba*, intervention

Operation	N	DK/DTR	p20	p40	p60	p80
Baseline	1,253	1	339	538	802	1,362
2nd Operation	1,709	11	525	844	1,326	2,204
3rd Operation	1,203	0	656	1,114	1,730	2,693

*Not adjusted for inflation.

3.2 Women's health

This section summarizes the demographic characteristics, socioeconomic status, and health status of women of reproductive age (15-49 years) participating in the SMI-Nicaragua third operation household survey.

3.2.1 Demographic characteristics

The age distribution of the de facto population of women of reproductive age participating in the women's health or pregnancy interviews in Nicaragua is shown in Figure 3.4 by five-year age groups. About 56% of all women participating in the third operation SMI-Nicaragua household survey were younger than 30 years of age, 28% were between the ages of 30 and 39, and 16% were between the ages of 40 and 49.

Table 3.5 shows the marital status of women in the sample and their relationship to the head of the household. While 28% of women reported being married and 39.2% being partnered, 21.7% indicated they were single. Eighteen percent of women were reported at the SMI-Nicaragua census to be the head of the household, 44% to be the spouse of the head of the household, and 2.4% to be the partner of the head of the household.

Figure 3.4: Age of respondents among women of reproductive age, unweighted, intervention

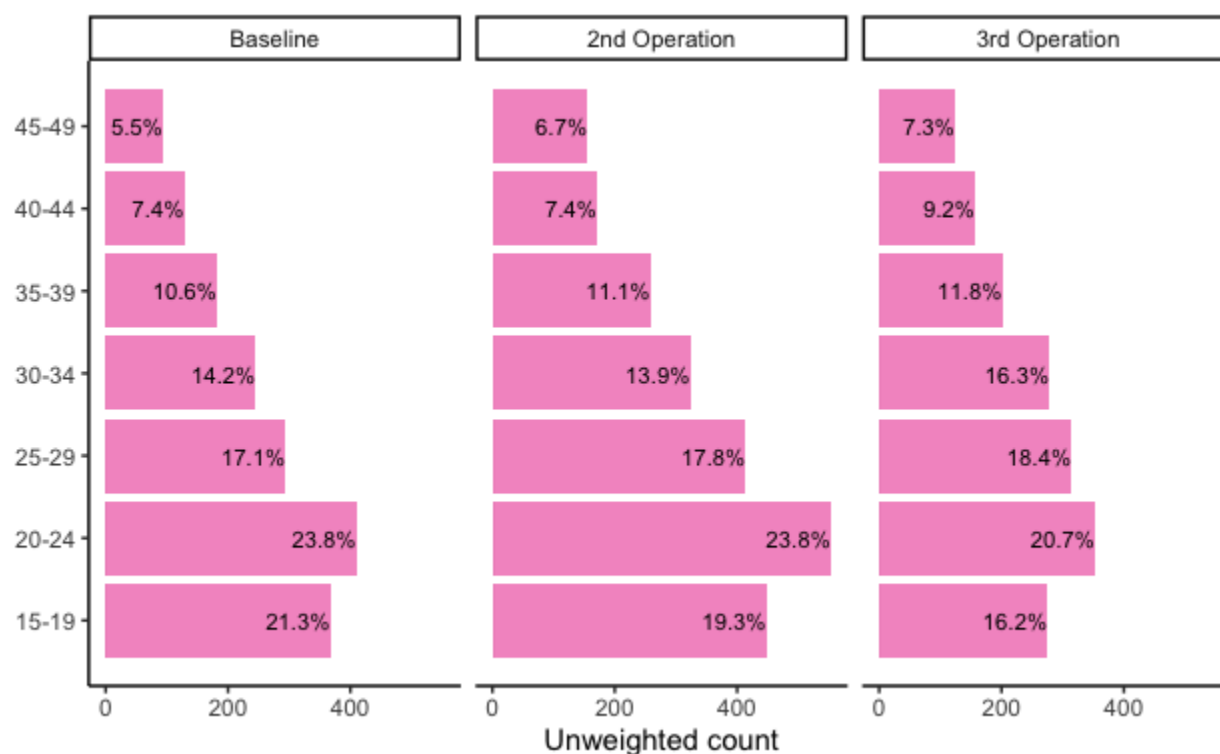


Table 3.5: Demographic characteristics of respondents, unweighted, intervention

	Baseline		2nd Operation		3rd Operation	
	n	%	n	%	n	%
Marital status*						
Single	510	29.7	436	18.8	369	21.7
Married	518	30.1	673	29	476	28
Civil union/partnered	603	35.1	929	40	667	39.2
Divorced	2	0.1	7	0.3	5	0.3
Separated	68	4	263	11.3	169	9.9
Widowed	19	1.1	15	0.6	15	0.9
Other	0	0	0	0	0	0
Don't know	0	0	0	0	1	0.1
Decline to respond	0	0	0	0	0	0
Respondent's relationship to head of household						
Head of household	213	12.4	367	15.8	302	17.7
Spouse	424	24.7	746	32.1	749	44
Partner	386	22.4	434	18.7	40	2.4
Biological child	410	23.8	541	23.3	395	23.2
Adopted or stepchild	21	1.2	24	1	15	0.9
Grandchild	38	2.2	46	2	33	1.9

	Baseline		2nd Operation		3rd Operation	
	n	%	n	%	n	%
Niece	22	1.3	14	0.6	16	0.9
Mother	4	0.2	2	0.1	0	0
Sister	28	1.6	21	0.9	23	1.4
Daughter-in-law	116	6.7	86	3.7	92	5.4
Sister-in-law	14	0.8	11	0.5	8	0.5
Grandmother	0	0	0	0	0	0
Mother-in-law	1	0.1	2	0.1	0	0
Other relative	4	0.2	3	0.1	13	0.8
Unrelated person	35	2	15	0.6	16	0.9
Not registered**	2	0.1	7	0.3	0	0
Other	2	0.1	4	0.2	0	0
Don't know	0	0	0	0	0	0
Decline to respond	0	0	0	0	0	0

*At baseline, marital status is reported by the respondent in the census. In the second and third operations, marital status is reported by the woman at the start of the Maternal Health Questionnaire.

** Relationship to the head of household was not collected for women who were not registered in the SMI census and added at the time of the household survey.

3.2.2 Education attainment and literacy

Eighty-nine percent of third operation survey participants had some formal education (Table 3.6). For 46.3% of these women, the highest level of education completed was primary schooling (Table 3.7). Literacy was assessed by asking respondents to read from a card the following sentence: “La salud del niño es muy importante para su desarrollo en la vida.” Seventy-seven percent of women surveyed were able to read the whole sentence. Eleven percent of women could not read the sentence at all.

Table 3.6: Education attainment and literacy, intervention

	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Ever attended school	1712	85.6	(81.5 - 88.9)	2318	86.1	(83.4 - 88.4)	1701	89.1	(86.4 - 91.3)
Attended literacy course	1713	8.0	(5.9 - 10.8)	2316	16.4	(13.1 - 20.3)	1700	10.4	(8.4 - 12.8)

Table 3.7: Educational attainment and literacy, detailed, intervention

	Baseline			2nd Operation			3rd Operation		
	n	%	CI	n	%	CI	n	%	CI
Educational attainment and literacy									
Primary	777	47.2	(39 - 55.4)	981	47.2	(41.2 - 53.1)	715	46.3	(39.9 - 52.8)
Secondary/High School*	519	38.2	(34 - 42.3)	852	43.9	(39.2 - 48.6)	634	41.3	(38 - 44.7)
University	151	13	(7.9 - 18.2)	158	7.9	(4.4 - 11.3)	145	10.5	(6 - 15.1)

	Baseline			2nd Operation			3rd Operation		
	n	%	CI	n	%	CI	n	%	CI
Technical school	21	1.6	(0.6 - 2.6)	21	1.1	(0.4 - 1.7)	20	1.8	(0.8 - 2.7)
Don't know	0	0	-	0	0	-	0	0	-
Decline to respond	0	0	-	0	0	-	0	0	-
Literacy									
Cannot read at all	190	10.8	(7.9 - 13.6)	302	13.4	(11.3 - 15.5)	189	10.8	(8.6 - 13)
Can read parts	233	13.5	(11.1 - 16)	339	14.8	(12.3 - 17.3)	198	11.4	(8.8 - 13.9)
Can read entire sentence	1281	75.4	(71.1 - 79.7)	1666	71.6	(67.5 - 75.6)	1300	76.9	(73.4 - 80.5)
Visually impaired	7	0.3	(0.1 - 0.5)	6	0.3	(0 - 0.5)	13	0.9	(0.2 - 1.6)
Don't know	1	0	-	4	0	-	2	0	-
Decline to respond	1	0	-	2	0	-	0	0	-

*At the first and second operations 'Secondary' and 'High School' were separate categories. They are presented here together for comparability with third operation, where the response options included a single category 'Secondary/High School'.

3.2.3 Employment

As summarized in Table 3.8, the vast majority of respondents in the third operation were homemakers (65.3%). Of the 217 women who reported being employed and working at the time of the interview, most (96.5%) identified “Employee” as their occupational role.

Table 3.8: Employment, intervention

	Baseline			2nd Operation			3rd Operation		
	n	%	CI	n	%	CI	n	%	CI
Employment status									
Homemaker	1300	70.6	(64.5 - 76.8)	1743	68.7	(63.9 - 73.6)	1198	65.3	(59.3 - 71.4)
Self-employed	57	4.5	(2.1 - 6.9)	128	7.9	(5.1 - 10.7)	217	13.8	(10.1 - 17.5)
Employed/paid for work	171	11.6	(8.4 - 14.9)	228	10.6	(7.7 - 13.5)	155	11.3	(8.3 - 14.2)
Student	168	12.2	(9.1 - 15.3)	194	11.7	(9.1 - 14.4)	117	8.1	(5.9 - 10.4)
Employed by a family member without pay	2	0.2	(0 - 0.6)	5	0.3	(0 - 0.7)	7	0.6	(0 - 1.2)
Unable to work due to disability	7	0.3	(0.1 - 0.5)	10	0.7	(0.2 - 1.2)	3	0.5	(0 - 1)
Employed in a cooperative	3	0.1	(0 - 0.2)	1	0	-	2	0.2	(0 - 0.6)
Employed, but did not work in last week	4	0.4	(0 - 1.1)	3	0.1	(0 - 0.2)	2	0.1	(0 - 0.4)
Retired	1	0	-	0	0	-	0	0	-
Don't know	0	0	-	0	0	-	0	0	-
Decline to respond	0	0	-	3	0	-	0	0	-
Occupational role, among women employed and being paid for work									
Employee	167	96	(91.9 - 100)	215	95.1	(91.4 - 98.8)	152	96.5	(92 - 100)
Employer	3	2.4	(0 - 5.5)	1	1.2	(0 - 3.6)	1	2	(0 - 5.7)
Independent contractor	1	1.6	(0 - 4.6)	3	1.1	(0 - 2.4)	2	1.5	(0 - 4.1)
Proprietor	0	0	-	8	2.5	(0 - 5)	0	0	-
Don't know	0	0	-	1	0	-	0	0	-
Decline to respond	0	0	-	0	0	-	0	0	-

3.2.4 Contraception

The coverage of contraceptive methods is one of the indicators most frequently used to assess the success of contraception program activities. It is also widely used as a determinant of fertility. Table 3.9 shows the use of contraception among all women and among those women considered to be in need of contraception (those who are married or partnered, excluding those who report the following characteristics: does not have sexual relations, virgin, menopausal, infertile, pregnant, or wants to become pregnant). Even women not considered “in need” of contraception may use a method. Additionally, contraception methods are divided among traditional and modern methods (see appendix B for details). Seventy-two percent of all survey respondents in the third operation reported current use of at least one contraceptive method. Among women in need, 86.1% reported using at least one method of contraception, and 85.2% report using a modern method. Finally, Table 3.9 shows the prevalence of interruption of contraceptive methods, which poses major concerns for contraception program managers. At

the third operation, 6.9% of women who reported any use of contraception in the previous year reported any interruption in the use of contraceptive methods.

Table 3.9: Current use of modern contraceptive methods, women 15-49 years of age who are married or partnered and in need of contraception (MI2010/MI2030), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women currently in need of contraception	1115	81.9	(77.5-85.6)	1600	82	(78.6-84.9)	1143	81.2	(77.8-84.2)
Women using any contraception, among all women	1115	69.5	(65-73.6)	1600	69.2	(64.8-73.3)	1143	72.3	(68.8-75.5)
Women using any method, among those in need	958	83.6	(79.8-86.8)	1369	80.4	(76.2-84)	982	86.1	(82.7-88.9)
Women (age 15-49) currently using a modern method of contraception (MI2010)	958	83.1	(79.4-86.3)	1369	79.3	(75-82.9)	982	85.2	(81.8-88)
Women (age 15-49) who report having stopped using a method of contraception during the previous year (MI2030)	846	4	(2.5-6.4)	1151	2.7	(1.9-4)	762	6.9	(4.8-9.7)

3.2.5 Access to health services

Several survey questions were used to assess access to health care facilities. Respondents were asked to estimate proximity to health care facilities in terms of distance (kilometers) and travel time. Not surprisingly, respondents typically had more difficulty estimating distance to health care facilities. As shown in the Table 3.10, “Don’t know” responses to the distance questions were exceedingly common.

Table 3.10 shows the percentile responses and mean for distance and time across the three operations. Excluding the 655 women who were unable to estimate the distance to the closest health facility in the third operation, 75% of women reported living 3 kilometers or less from a health facility. Three-quarters of the sample indicated that it took less than 30 minutes to reach this facility by the usual means of transportation. One-quarter estimated the travel time from their household to the closest health facility to be 30 minutes or more.

Table 3.10: Proximity to nearest health facility (percentiles), intervention

Operation	N	DK/DTR	Minimum	25th Percentile	Median	75th Percentile	Maximum
Distance, km							
Baseline	1,561	152	0	1	2	5	300
2nd Operation	1,532	787	0	0.5	1	3	100
3rd Operation	1,047	655	0	0.2	1	3	118
Travel time, min							
Baseline	1,645	8	1	10	20	45	1,800
2nd Operation	2,092	116	1	10	20	40	3,000
3rd Operation	1,678	24	0	10	15	30	2,400

3.2.6 Fertility

Table 3.11 shows the percentage of women with a live birth in the past year across two age groups: all women in the household surveys aged 15-49, and adolescents aged 15-19. At the third operation 9.5% of all women had a live birth in the last year, compared to 14.1% of adolescents aged 15-19.

Table 3.11: Women in the household surveys with a live birth in the past year (MI1080/MI1090), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women aged 15-49 with a live birth in the last year (MI1080)	1713	11.9	(10.5-13.6)	2319	8.8	(7.8-9.9)	1702	9.5	(8.1-11)
Women aged 15-19 with a live birth in the last year (MI1090)	364	13.9	(10.4-18.5)	448	9.8	(7.8-12.3)	275	14.1	(10-19.4)

3.2.7 Exposure to health system interventions

Women who receive antenatal care often receive guidance or advice about danger signs for children's health. In the household survey women were asked to name the danger signs that they can recognize in newborns (for the list of danger signs see appendix B). Table 3.12 displays the proportion of women who can recognize at least five danger signs in newborns. In Nicaragua at the third operation 13.9% of women with a birth in the last two years were able to recognize at least five danger signs in newborns.

Table 3.12: Proportion of women who can recognize at least 5 danger signs in newborns (MI4110), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women (age 15-49) with a birth in the last two years who can recognize at least 5 danger signs in newborns (MI4110)	551	33.9	(29.6-38.6)	641	23.3	(17.9-29.9)	423	13.9	(9.7-19.5)

Respondents were asked about their exposure to contraception counseling delivered by health care providers and community health workers as shown in Table 3.13. Forty percent of women in the third operation reported being advised about contraception at a health care facility or by community health workers, compared to 39.2% at baseline.

Table 3.13: Contraception counseling by health care providers or community health workers (MI2040), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Married or partnered women (age 15-49) who received contraception counseling by CHW or at facility (MI2040)	1112	39.2	(34.2-44.5)	1594	34.2	(29.5-39.1)	912	40	(35.4-44.7)

3.3 Obstetric care

Participating women were interviewed about all live births in the last five years, but to reduce the impact of recall bias, results reported here are for each woman's most recent birth in the last two years. At the baseline, 657 women were interviewed about at least one birth in the last two years. At the second operation, 877 women were interviewed about births in the last two years, and at the third operation, 575 women with at least one birth in the

last two years were interviewed. The definition of “most recent birth” in the data changed between the baseline and the second operation.

3.3.1 Antenatal care

Early and regular checkups by trained medical providers are important in assessing the physical status of women during pregnancy and provide an opportunity to intervene in a timely manner if any problems are detected. The Maternal and Child Health Questionnaire captured information from women on both overall coverage of antenatal care and the content of care received. To obtain information on the source of antenatal care, interviewers recorded all persons a woman consulted for care. Timing of antenatal care was assessed by asking women how many weeks or months pregnant they were when they attended their first antenatal care visit. The same details were recorded for up to eight antenatal care visits.

Antenatal care can be more effective in avoiding adverse pregnancy outcomes when it is sought early in the pregnancy and continues until delivery. According to the national norm in Nicaragua, it is recommended that women receive a minimum of four antenatal care visits. Table 3.14 shows the percentage of women who received at least one and at least four antenatal care visits with skilled professionals (i.e., doctor, nurse, or auxiliary nurse). At the third operation 72% received at least four antenatal care visits with skilled professionals, compared to 83.1% at the baseline.

Table 3.14: Antenatal care coverage for most recent birth in the last two years, women 15-49 years of age (MI3010/MI3020), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women (age 15-49) who received at least one antenatal care visit by skilled personnel in their most recent pregnancy in the last two years (MI3010)	657	97.1	(95-98.3)	877	89.1	(84.6-92.5)	573	90.9	(87.8-93.3)
Women (age 15-49) who received at least four antenatal care visits by skilled personnel in their most recent pregnancy in the last two years (MI3020)	657	83.1	(79.9-85.9)	858	75.2	(69.4-80.2)	561	72	(67.8-75.9)

3.3.2 Delivery care

Proper medical attention and hygienic conditions during delivery can reduce the risk of complications, infections, and even death for the mother and newborn baby. Characteristics of the delivery, including place of delivery and assistance at delivery were captured for all births in the five years preceding the survey. To reduce recall bias, only data from the most recent delivery within the last two years are summarized.

Women were asked about the proximity to the health facility used to deliver. Of the 472 women from the third operation who delivered in a facility, 436 were able to estimate the travel time to the facility (Table 3.15). Fifty percent of women traveled more than one hour to the facility to deliver.

Table 3.15: Travel time in minutes to health facility for delivery, most recent birth in the last two years, intervention

Operation	N	DK/DTR	Minimum	25th Percentile	Median	75th Percentile	Maximum
Baseline	576	7	1	15	60	120	2,700
2nd Operation	653	103	1	15	60	150	12,000
3rd Operation	472	36	1	20	60	120	2,880

The assistance a woman receives during childbirth has important health consequences for both mother and child. Table 3.16 shows that at the third operation 87.5% of women delivered in a health facility with a skilled birth attendant, compared to 87.7% at baseline.

Table 3.16: In-facility delivery with skilled birth attendant: most recent birth in the last two years, women 15-49 years of age (MI4010), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women who delivered in any facility	657	88.2	(82.5-92.3)	876	87.1	(82.3-90.8)	569	87.6	(79.9-92.7)
Woman who delivered with skilled birth attendant	657	88.6	(83.3-92.4)	876	88	(83.5-91.5)	569	90.9	(85.9-94.2)
Women (age 15-49) who delivered in facility with skilled attendant in their most recent pregnancy in the last two years (MI4010)	657	87.7	(82.3-91.6)	876	86.6	(81.9-90.3)	569	87.5	(79.7-92.6)

3.3.3 Early initiation of breastfeeding

Coverage of early initiation of breastfeeding is defined as the percentage of women who had a live birth in the past two years and put the child to the breast within one hour of birth. Table 3.17 shows that 70.7% of women initiated breastfeeding within one hour of birth.

Table 3.17: Early initiation of breastfeeding for most recent birth in the past two years, women 15-49 years of age (MI5050), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children born in the last two years who were breastfed within one hour after birth (MI5050)	681	82.2	(78.3-85.6)	892	78.3	(73.2-82.6)	579	70.7	(65-75.9)

3.3.4 Postpartum care for woman

Postpartum care is important both for the mother and the child to treat complications arising from the delivery, as well as to provide the mother with important information on how to care for herself and her child. The postpartum period is defined as the time between the delivery of the placenta and 42 days (six weeks) following the delivery. The timing of postpartum care is important: the first two days after delivery are critical, because most maternal and neonatal deaths occur during this period.

Characteristics of postnatal care, including timing, location, and personnel providing care were captured for all births in the five years preceding the survey. To reduce recall bias, only data from the most recent delivery in the last two years are summarized in the tables below.

Table 3.18 shows the percentage of women with a birth in the last two years who received postpartum care within 7 and 10 days of delivery. Eighty-seven percent of women reported being checked within 10 days of delivery by skilled personnel in a health facility or being checked before discharge from the birthing facility, while 46.1% reported a postpartum care visit within 7 days.

Table 3.18: Postpartum checkup for mother for most recent birth in the past two years, women 15-49 years of age (I4030/MI4030), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Skilled postpartum care visit within 10 days (doctor, nurse, or auxiliary nurse)	657	60.1	(54.3-65.7)	868	41.1	(36.1-46.3)	567	48.3	(42.7-53.9)
Checked after in-facility delivery*	-	-	-	749	91.3	(88.1-93.8)	508	95.3	(93-96.9)
Women (age 15-49) who received postpartum care within 10 days or before discharge with skilled personnel in their most recent pregnancy in the last two years (I4030)**	657	60.1	(54.3-65.7)	874	82.6	(77.6-86.7)	572	86.8	(81.7-90.6)
Women (age 15-49) who had a postpartum care visit within 7 days with skilled personnel in their most recent pregnancy in the last two years (MI4030)	657	58.1	(52.2-63.7)	868	33.6	(28.7-38.9)	567	46.1	(41.1-51.2)

*Not asked at baseline.

**The second follow-up survey included an additional question that asked if women were checked before discharge after delivering in facility. If a woman was checked before discharge, she was considered to have passed this indicator. Due to the addition of this question, the baseline and follow-up values are not strictly comparable.

3.3.5 Postnatal care for baby

The results regarding postnatal care for the neonate are shown in Table 3.19. The table shows the percentage of women with a birth in the last two years whose infants were checked after delivery; percent distributions of infants who were ever checked by skilled personnel within 24 hours of delivery; and percent distributions of infants who were checked by skilled personnel within 3 days of delivery.

At the third operation 85.5% of neonates received postnatal care, 43.1% received postnatal care by skilled personnel within 24 hours of delivery, and 77.4% received care by skilled personnel within 10 days, compared to 79.6% at baseline.

Table 3.19: Postnatal checkup for neonate for woman's most recent birth in the past two years, women 15-49 years of age (MI4101), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Infant was ever checked	635	83.4	(77.8-87.8)	811	74.6	(68.5-79.8)	506	85.5	(80.7-89.3)
Infant received postnatal care by skilled personnel within 24 hours of birth	635	35.2	(30.4-40.3)	811	29.7	(25-34.8)	506	43.1	(35.7-50.7)

	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Infant received postnatal care by skilled personnel within 10 days of birth (MI4101)	635	79.6	(73.3-84.7)	811	65.9	(59.5-71.7)	506	77.4	(72.3-81.9)

3.3.6 Maternal waiting homes

Some facilities that attend deliveries have a *casa materna* or maternal waiting home nearby to provide women who live far away a place to stay while they await delivery or while they recover and prepare to travel home with their infant. Table 3.20 displays how often women have used maternal waiting homes during their most recent pregnancy in the past two years. 33.5% of women in the third operation report using a maternal waiting home before giving birth.

Table 3.20: Use of maternal waiting homes for most recent birth in the past two years, women 15-49 years of age (MI4120), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women (age 15-49) who used a maternal waiting home during their most recent pregnancy in the last two years (MI4120)	657	11.4	(8.3-15.5)	876	26.1	(19.6-33.7)	574	33.5	(25.3-42.9)

3.4 Child health

The age and sex distribution of the de facto population of children in Nicaragua aged 0-59 months participating in the Child Health Interview or the anthropometric measures at the baseline and third operation are shown by six- or 12-month age groups in Figure 3.5 and Figure 3.6 respectively. Twenty-one percent of children surveyed at baseline and 20% of children surveyed at the third operation were under 1 year old at the time of the interview. The age distributions of female and male children are similar.

Figure 3.5: Age and sex of children aged 0-59 months in child health survey or anthropometric measures of the de facto population by six- to twelve-month age groups, baseline survey unweighted, intervention

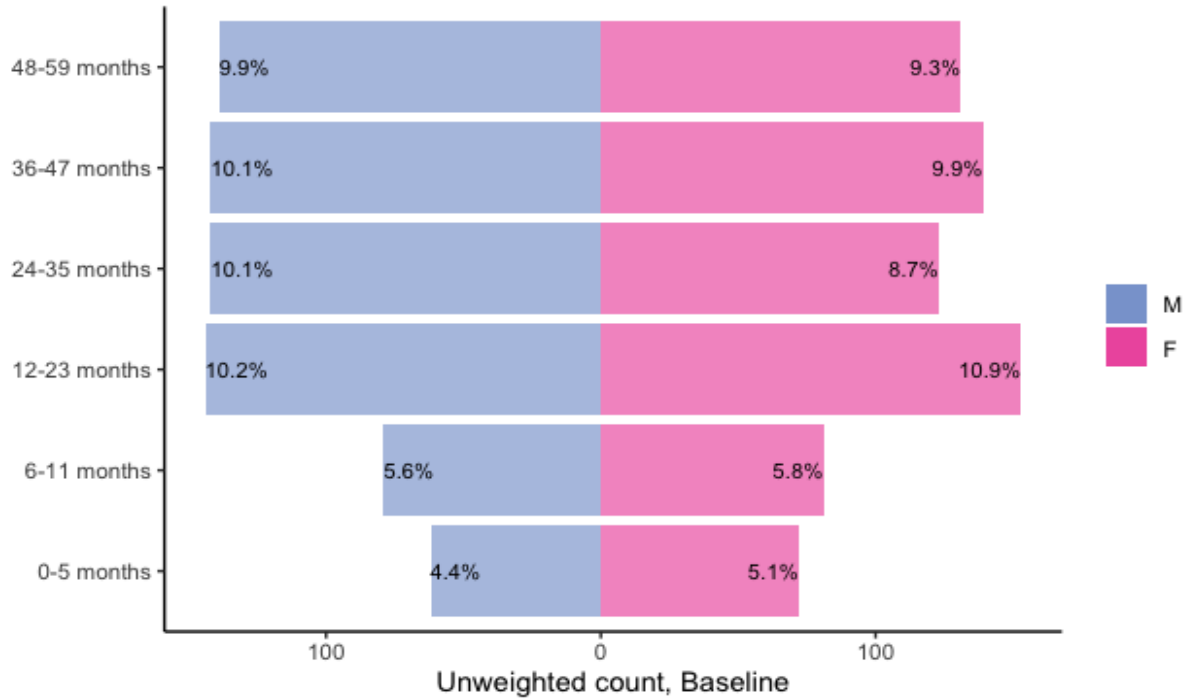
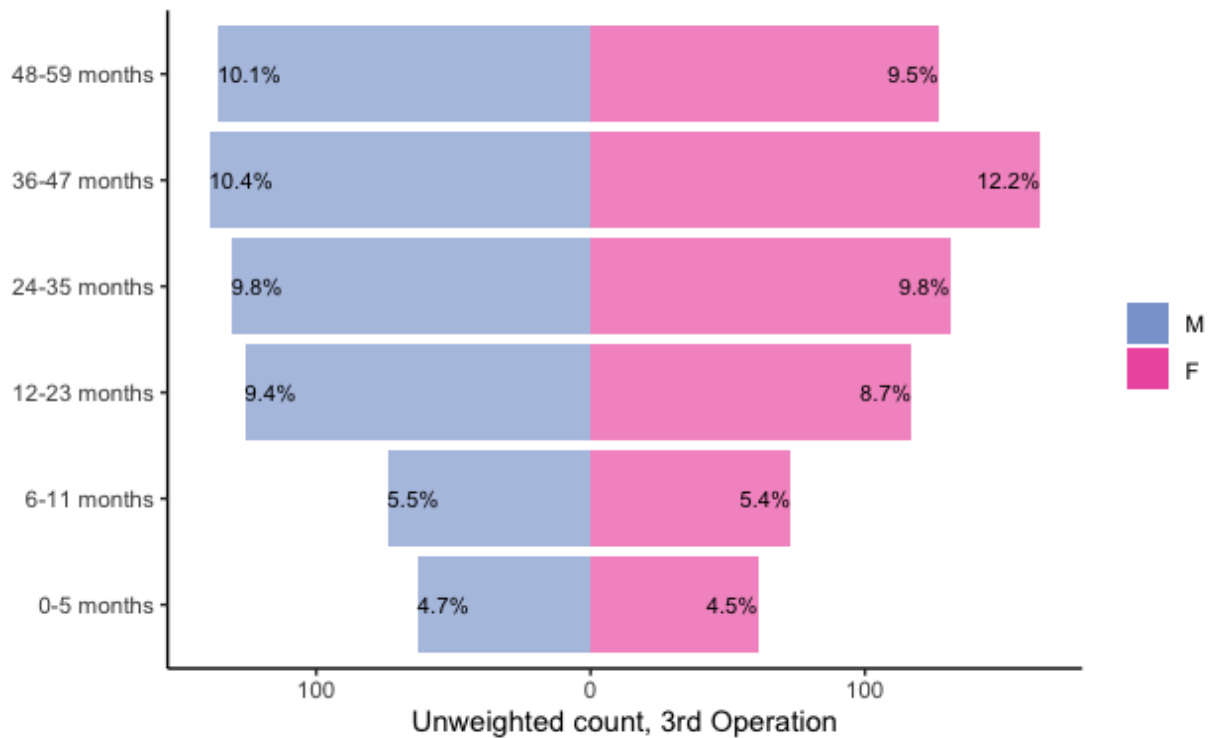


Figure 3.6: Age and sex of children aged 0-59 months in child health survey or anthropometric measures of the de facto population by six- to twelve-month age groups, third operation survey unweighted, intervention



3.4.1 Diarrhea

Dehydration caused by severe diarrhea is a major cause of morbidity and mortality among children. Exposure to diarrheal disease-causing agents is frequently a result of use of contaminated water and unhygienic practices related to food preparation and disposal of feces. The prevalence of diarrhea was estimated by asking caregivers whether their children aged 0-59 months had had diarrhea in the two weeks preceding the interview. If the child had had diarrhea, the caregiver was asked about treatment and feeding practices during the diarrheal episode.

A simple and effective response to dehydration caused by diarrhea is a prompt increase in the child's fluid intake through some form of oral rehydration therapy (ORS). Oral rehydration therapy may include the use of a solution prepared from commercially produced packets of powdered oral rehydration salts, commercially produced bottled oral serums, or homemade fluids usually prepared from sugar, salt, and water. Other treatments, including zinc, may be administered as well. At the third operation 53.9% of children received ORS, while 13.3% received zinc. Eleven percent of children received both ORS and zinc at the third operation.

Table 3.23: Diarrhea treatment with ORS and zinc (I5060), children aged 0-59 months, intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
ORS administered	197	53.8	(44-63.3)	246	52	(43.5-60.5)	184	53.9	(45.9-61.7)
Zinc administered	197	2.6	(1.1-5.9)	246	10.4	(7-15)	183	13.3	(8.9-19.4)
ORS and zinc administered to standard (I5060)	197	1.4	(0.5-4.3)	246	6.5	(3.9-10.7)	184	10.7	(7.2-15.6)

3.4.2 Immunization

Information on immunization coverage was collected for all children aged 0-59 months whose caregivers participated in the survey. A review of the child's vaccination card (if available) was used to determine coverage. In Table 3.24, coverage is estimated to include all children with full compliance for age as specified in the national immunization scheme at the time of the survey (see appendix B for details), according to a mark that the immunization was received on the vaccination card (for children with a vaccination card available for review at the time of the interview). Children too young to have received a specific vaccine are counted as covered in order to maintain a comparable all-ages sample across vaccine types. At the third operation 52.5% of children were considered fully vaccinated for their age, compared to 48% at baseline.

Table 3.24: Immunization against common childhood illnesses, children aged 0-59 months, according to vaccination card (I5020), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
BCG	1398	71.4	(66.3-75.9)	1802	67.2	(63.1-71.1)	1331	74.7	(69.7-79.2)
Polio	1398	66.4	(60.7-71.5)	1802	62	(57.8-66)	1331	69.3	(63.4-74.6)
Pentavalent	1398	65.4	(60.4-70.1)	1802	64.4	(59.9-68.6)	1331	69.5	(63.7-74.8)
Pneumococcal	1398	90	(87.5-92)	1802	61	(56.3-65.5)	1331	68.4	(62.1-74.1)

	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Rotavirus	1398	58.1	(52-64)	1802	61.6	(57.3-65.8)	1331	72.5	(67.2-77.2)
DPT	1398	67.7	(63.4-71.7)	1802	65.6	(61.7-69.3)	1331	70.7	(65.3-75.5)
MMR	1398	72.6	(67.8-77)	1802	70.9	(67.4-74.1)	1331	63.9	(58.4-69)
Children 0-59 months identified as having received full vaccinations for age by vaccine card (I5020)	1398	48	(41.8-54.3)	1802	46.7	(42.1-51.3)	1331	52.5	(45-59.9)

Table 3.25 shows the proportion of children aged 12-23 months who received the measles, mumps, and rubella (MMR) vaccine according to their vaccine card. At the third operation, 59.4% of children aged 12-23 had received the MMR vaccine, compared to 70.9% at baseline.

Table 3.25: Children 12-23 months of age who received MMR vaccine (MI5025), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 12-23 months who received MMR vaccine according to card (MI5025)	296	70.9	(62.9-77.9)	360	73.8	(67.8-79.1)	241	59.4	(52-66.3)

3.4.3 Deworming

Administration of deworming treatment every six months has been shown to reduce the prevalence of anemia in children. Forty percent of children aged 18-59 months received at least two doses of deworming treatment in the year preceding the third operation interview (Table 3.26).

Table 3.26: Deworming treatment among children aged 18-59 months (MI5030), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 18-59 months who received 2 doses of deworming in the last year (MI5030)	966	34.1	(31.2-37.1)	1254	33.8	(30-37.9)	942	40	(34.4-45.8)

3.4.4 Breastfeeding

Coverage of exclusive breastfeeding is defined as the percentage of infants born in the six months prior to the survey who received only breast milk during the previous day. This information is obtained through a 24-hour dietary recall in which the caregiver indicates what the child consumed during the previous day and night. Table 3.27 shows the proportion of children 0-5 months who are exclusively breastfed. In Nicaragua during the third operation, the sample includes 122 children who are under 6 months of age and who have sufficiently complete dietary recall information to determine whether they are exclusively breastfed. Twenty-seven percent of children under 6 months of age are exclusively breastfed.

Table 3.27: Exclusive breastfeeding among children aged 0-5 months (MI5040), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 0-5 months who were exclusively breastfed on the previous day (MI5040)	134	59.5	(47.9-70.1)	165	40.2	(32.6-48.4)	122	26.7	(19-36)

3.4.5 Nutritional status in children

The nutritional status of children aged 0-59 months is an important outcome measure of children's health. The SMI-Nicaragua third operation Household Survey collected data on the nutritional status of children by measuring the height and weight of all children aged 0-59 months residing in surveyed households, using standard procedures. Hemoglobin levels of these children were also assessed in the field, using a portable HemoCue™ machine, and these data were used to estimate anemia prevalence. Medically trained personnel who were specifically trained to standardize the anthropometric and hemoglobin measurements conducted the testing. The parents of anemic children (hemoglobin level <11.0 g/dL, with altitude adjustment) were informed of this result in real-time and were referred for treatment to the appropriate health service.

The height-for-age indicator was calculated using growth standards published by the World Health Organization (WHO) in 2006. The growth standards were generated using data collected in the WHO Multicenter Growth Reference Study. The findings of the study, whose sample included children in six countries (Brazil, Ghana, India, Norway, Oman, and the United States), describe how children should grow under optimal conditions. As such, the WHO Child Growth Standards can be used to assess children all over the world, regardless of ethnicity, social and economic influences, and feeding practices. The indicator is expressed in standard deviation units from the median in the Multicenter Growth Reference Study.

A total of 1,342 children aged 0-59 months participated in the SMI-Nicaragua third operation. In practice, 1,295 of these children underwent the physical measurement module. Height and weight data are presented for 1,294 of these children (99.9%, unweighted). One-thousand-two-hundred-ninety-five children 0-59 months of age were eligible for the anemia test. Hemoglobin was measured in 1,190 children (92%, unweighted, of children 0-59 months of age). Parental consent was refused for 91 children, zero were not measured because anthropometrists could not obtain a sufficient capillary blood sample or any sample at all, and fourteen cases were not tested for other reasons (for example, because the child did not cooperate).

3.4.6 Height-for-Age

Height-for-age is an indicator of linear growth retardation and cumulative growth deficits in children. Children whose height-for-age z-score is below minus two standard deviations (-2 SD) from the median of the WHO reference population are considered short for their age (stunted) or chronically malnourished. Stunting reflects failure to receive adequate nutrition over a long period of time and is affected by recurrent and chronic illness. Height-for-age, therefore, represents the long-term effects of malnutrition in a population and is not sensitive to recent, short-term changes in dietary intake. Table 3.30 shows the prevalence of stunting in children aged 0-59 months. At the third operation 10.7% are stunted.

Table 3.30: Prevalence of stunting in children aged 0-59 months (MI1070), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 0-5 months with height <-2 SD of the mean of the reference population	134	0.6	(0.1-4)	158	3.4	(1.5-7.6)	122	0.8	(0.1-5.8)
Children 6-23 months with height <-2 SD of the mean of the reference population	445	9.4	(7-12.5)	518	12.6	(9.6-16.2)	378	4.9	(2.9-8.1)

	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 24-59 months with height <-2 SD of the mean of the reference population	787	17.6	(13.8-22.2)	1042	18.8	(15.3-22.9)	795	15	(11.8-18.8)
Children 0-59 months with height <-2 SD of the mean of the reference population for age (MI1070)	1366	13.3	(10.8-16.3)	1719	15.6	(13.1-18.4)	1295	10.7	(8.6-13.2)

3.4.7 Anemia

Anemia is a condition characterized by low concentration of hemoglobin in the blood. Hemoglobin is necessary for transporting oxygen to tissues and organs in the body. The reduction in oxygen available to organs and tissues when hemoglobin levels are low is responsible for most of the symptoms experienced by anemic persons. The consequences of anemia include general body weakness, frequent tiredness, and lowered resistance to disease. It is of concern in children because anemia is associated with impaired mental and motor development. Overall, morbidity and mortality risks increase for individuals suffering from anemia.

Common causes of anemia include inadequate intake of iron, folate, vitamin B12, or other nutrients. This form of anemia is commonly referred to as iron-deficiency anemia and is the most widespread form of anemia in the world. Anemia can also be the result of thalassemia, sickle cell disease, malaria, or intestinal worm infestation.

Children with hemoglobin levels of <11.0 g/dL were considered anemic. The cutpoints for anemia are adjusted (raised) in settings where altitude is more than 1,000 meters above sea level, to account for lower oxygen partial pressure, a reduction in oxygen saturation of blood, and an increase in red blood cell production. Although some regions of Nicaragua are mountainous and well above 1,000 meters, the majority of the population resides at lower levels. The highest elevation of a surveyed household at the third operation was 1,444 meters above sea level; 6.2% of children (unweighted) lived above 1,000 meters. Correction for elevation was applied to anemia diagnosis where data collectors measured altitude over 1,000m (using a handheld GPS device).

Table 3.31 indicates that 38.5% of children under age 5 in Nicaragua are anemic. In Nicaragua at the third operation 51.4% of children aged 6-23 months, the targeted population for anemia intervention, were found to be anemic.

Table 3.31: Prevalance of anemia, children aged 0-59 months (I1060/MI1050), intervention

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 0-5mo with hemoglobin <110g/L	7	70.6	(40.1-89.6)	28	69.3	(49.8-83.7)	83	44.6	(33.4-56.4)
Children 6-23mo with hemoglobin <110g/L (I1060)	435	53.9	(48-59.7)	487	51.3	(44.8-57.7)	350	51.4	(42.3-60.5)
Children 24-41mo with hemoglobin <110g/L	398	35.4	(30.3-40.9)	540	43.5	(37.9-49.2)	373	32	(26.5-38)
Children 42-59mo with hemoglobin <110g/L	378	24.2	(19.3-30)	464	36.5	(31.6-41.6)	384	32	(25.9-38.8)
Children 0-59mo with hemoglobin <110g/L (MI1050)	1218	38.8	(35-42.8)	1518	44.4	(39.9-49.1)	1179	38.5	(33.2-44.2)
Children 6-59mo with hemoglobin <110g/L	1211	38.6	(34.8-42.6)	1491	43.9	(39.3-48.6)	1107	38.2	(32.8-44)

Chapter 4: Health facility survey results

4.1 Summary of health facilities and medical record extraction

4.1.1 Health facility characteristics

A total of 42 facilities in intervention areas were surveyed for the third operation measurement. Results from these facilities are presented in this chapter. Results from comparison-area facilities are presented in Appendix D. Twenty ambulatory EONC health units, 19 basic EONC units, and 3 complete EONC units were included in the intervention area sample. Ambulatory level units include *Casa Base* and *Puesto de Salud* health facilities, while *Centros de Salud* and *Hospitales Primarios* (health centers and primary hospitals) make up basic level units. Departmental and regional hospitals in Nicaragua comprise the complete level EONC units. Health facilities are broken down by EONC in Table 4.1.

Table 4.1: Health facility classification, intervention areas

EONC	Baseline	1st Operation	2nd Operation	3rd Operation
Ambulatory	32	46	37	20
Basic	5	11	20	19
Complete	3	3	3	3
Total	40	60	60	42

Figure 4.1 is a map of all intervention health facilities visited at the third operation evaluation. Table 4.2 displays the locations of health facilities by health region and municipality in intervention areas from the baseline to third operation. Third operation health facilities were surveyed in 21 municipalities in 4 health regions.

Figure 4.1: Map of health facilities in third operation intervention areas



Table 4.2: Count of facilities by health region and municipality, intervention areas

Health Region	Municipality	Baseline	1st Operation	2nd Operation	3rd Operation
Bilwi	Prinzapolka	0	0	3	1
Bilwi	Puerto Cabezas	6	13	7	3
Bilwi	Waspán	3	7	2	5
Jinotega	El Cua	4	5	4	3
Jinotega	Jinotega	0	0	1	1
Jinotega	San Jose de Bocay	2	3	2	2
Jinotega	San Sebastián de Yalí	2	2	3	2
Jinotega	Santa Maria de Pantasma	1	1	3	3
Jinotega	Wiwilí	2	1	4	2
Las Minas	Bocana de Paiwas	3	1	3	1
Las Minas	Bonanza	1	2	2	1
Las Minas	Mulukuku	0	1	2	1
Las Minas	Rosita	2	3	2	2
Las Minas	Siuna	2	4	3	2
Matagalpa	Matagalpa	5	1	1	1
Matagalpa	Matiguás	3	3	5	4
Matagalpa	Rancho Grande	0	1	3	1
Matagalpa	San Dionisio	0	2	1	1
Matagalpa	Terrabona	0	2	3	1
Matagalpa	Tuma - La Dalia	4	5	5	3
Matagalpa	Waslala	0	3	1	2
Total		40	60	60	42

4.1.2 Medical record extraction

The medical record review component of the study included a review of 2,074 medical records at the third operation, 721 from the pre-evaluation period and 1,353 from the evaluation period (see chapter 2 for details on medical record time periods). The number and type of medical records reviewed varied depending on the type of facility and services provided. Records of antenatal care were collected from ambulatory and basic facilities at the baseline, first, second, and third operations. Records of uncomplicated delivery, immediate postpartum care, and obstetric and neonatal complications were collected from basic and complete facilities at the baseline, first, second, and third operations. Additionally, cervical cancer screening records were collected from ambulatory facilities for the first time at the third operation.

Table 4.3 below shows the total number of medical records of each type collected throughout this study. During the second operation measurement, records of obstetric and neonatal complications were recollected for the baseline time period to capture relevant data that reflect updated indicator definitions and standards of care that were not captured in the baseline or first operation surveys. The indicators and summaries detailed in chapter 4 of this report reflect only the re-collected baseline records for obstetric and neonatal complications, and omit records from the first operation.

As detailed in chapter 2, medical records reviewed for the third operation measurement were allocated into two time periods, pre-evaluation (January 1, 2019 through June 30, 2020) and evaluation (July 1, 2020 through June 30, 2022), to allow for a comparative analysis of indicator performance before and during the COVID-19 pandemic. Medical record indicator tables in this chapter display results for both pre-evaluation and evaluation time periods when available, while only the evaluation time period records are applicable to the performance indicator result.

Table 4.3: Medical Record Review sample size, intervention areas

MRR Type	Baseline	1st Operation	2nd Operation	3rd Operation, Pre-Evaluation	3rd Operation, Evaluation
Antenatal care	404	569	492	178	302
Cervical cancer screening	0	0	0	0	211
Immediate postpartum care	77	191	285	157	255
Neonatal complications	311	237	295	139	194
Obstetric complications	326	242	316	131	218
Uncomplicated delivery	90	221	316	116	173
Total	1,208	1,460	1,704	721	1,353

4.2 Child health and vaccination

During the Health Facility Observation, interviewers systematically observed vaccine storage and refrigeration capacities to evaluate successful cold chain logistics as defined by the monitoring indicator 7000. Ambulatory and basic facilities that store vaccines are required to have at least one functional refrigerator including temperature monitoring capacity, as well as a record of temperatures recorded twice daily for the thirty days prior to the observation. For a detailed definition of requirements for indicator 7000, see appendix B.

Table 4.4: Cold chain (MI7000), intervention, ambulatory and basic facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
At least one functional refrigerator	28	85.7	(66-94.9)	32	84.4	(66.3-93.7)	41	100	(-)	34	100	(-)
Temperature monitoring chart for each fridge	28	57.1	(37.5-74.8)	27	92.6	(72.8-98.3)	41	97.6	(83.4-99.7)	34	97.1	(80.2-99.6)
Temperature recorded twice daily during past 30 days	28	28.6	(14.3-48.9)	27	88.9	(68.9-96.7)	41	78	(62.2-88.5)	34	97.1	(80.2-99.6)
Cold chain according to standard (MI7000)	28	28.6	(14.3-48.9)	27	88.9	(68.9-96.7)	41	78	(62.2-88.5)	34	97.1	(80.2-99.6)

Ambulatory and basic facilities are also evaluated for their capacity to conduct child health care practices according to the standards defined in the monitoring indicator 7010. Interviewers systematically observed health facility equipment, medication, and vaccines. Documentation was also reviewed to evaluate continuous availability of medication and vaccines over the previous three months. For a detailed definition of requirements for indicator 7010, see appendix B. Improvement in child health provision capacity was more pronounced in basic intervention facilities than ambulatory intervention facilities.

Table 4.5: Child care services (MI7010), intervention, ambulatory facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
All childcare equipment observed and functional	32	53.1	(35.2-70.2)	42	90.5	(76.4-96.5)	37	81.1	(64.4-91)	20	90	(64.5-97.8)
Pediatric scales	32	81.2	(62.9-91.7)	42	100	(-)	37	83.8	(67.4-92.8)	20	95	(67.7-99.4)
Height rod	32	93.7	(76.8-98.6)	42	100	(-)	37	97.3	(81.7-99.7)	20	100	(-)
Stethoscope	32	90.6	(73.3-97.1)	42	97.6	(83.8-99.7)	37	100	(-)	20	95	(67.7-99.4)
Thermometer	32	71.9	(53.1-85.2)	42	95.2	(82-98.9)	37	100	(-)	20	100	(-)
Growth / Development card	32	96.9	(79.1-99.6)	42	92.9	(79.3-97.8)	37	94.6	(79.7-98.7)	20	100	(-)
All drugs observed on day of observation	32	81.2	(62.9-91.7)	42	92.9	(79.3-97.8)	37	91.9	(76.7-97.5)	20	95	(67.7-99.4)
Oral rehydration salts	32	90.6	(73.3-97.1)	42	100	(-)	37	91.9	(76.7-97.5)	20	95	(67.7-99.4)
Ferrous sulfate / zinc sulfate / zinc gluconate	32	96.9	(79.1-99.6)	42	100	(-)	37	100	(-)	20	100	(-)
Albendazole / mebendazole	32	93.7	(76.8-98.6)	42	92.9	(79.3-97.8)	37	100	(-)	20	100	(-)
All drugs continuously available in past three months	32	81.2	(62.9-91.7)	42	90.5	(76.4-96.5)	37	83.8	(67.4-92.8)	20	95	(67.7-99.4)
Facility stores vaccines	32	71.9	(53.1-85.2)	42	47.6	(32.6-63.1)	37	62.2	(45-76.7)	20	80	(54.6-93)
All vaccines observed on day of survey	23	13	(3.9-35.8)	20	100	(-)	23	95.7	(71.6-99.5)	16	75	(45.7-91.4)
Pentavalent / (DPT + Hep B + HiB)	23	65.2	(42.6-82.6)	20	100	(-)	23	100	(-)	16	100	(-)
Polio	23	65.2	(42.6-82.6)	20	100	(-)	23	95.7	(71.6-99.5)	16	100	(-)
Measles, Mumps, Rubella	23	65.2	(42.6-82.6)	20	100	(-)	23	95.7	(71.6-99.5)	16	93.7	(60.7-99.3)
Rotavirus	23	60.9	(38.6-79.4)	20	100	(-)	23	95.7	(71.6-99.5)	16	100	(-)
Pneumococcal conjugate	23	47.8	(27.4-69)	20	100	(-)	23	100	(-)	16	100	(-)
BCG	23	21.7	(8.7-44.8)	20	100	(-)	23	100	(-)	16	75	(45.7-91.4)
All vaccines continuously available in past three months	23	13	(3.9-35.8)	20	85	(59.6-95.6)	23	78.3	(55.2-91.3)	16	56.2	(29.8-79.6)
Child health supplies according to standard (MI7010)	32	12.5	(4.5-30.2)	42	76.2	(60.4-87)	37	59.5	(42.4-74.5)	20	50	(27.7-72.3)

Equipment data missing from four facilities at first operation.

Pharmacy data missing from four facilities at first operation.

Digital thermometer only captured as alternative to oral/axillary thermometers at second operation evaluation.

Ferrous sulfate three-month stock not captured at baseline.

Vaccine three-month stock only captured for MMR and BCG at baseline and first operation.

DPT + HepB + Hib not captured as Pentavalent alternatives at baseline and first operation.

Kardex data and three month-stock data not captured for all drugs at baseline evaluation.

Table 4.6: Child care services (MI7010), intervention, basic facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
All childcare equipment observed and functional	5	0	(-)	11	81.8	(42-96.5)	19	73.7	(47.6-89.6)	17	94.1	(62.7-99.3)
Pediatric scales	5	80	(11.1-99.2)	11	100	(-)	19	100	(-)	17	100	(-)
Height rod	5	80	(11.1-99.2)	11	100	(-)	19	100	(-)	17	100	(-)
Stethoscope	5	100	(-)	11	100	(-)	19	100	(-)	17	94.1	(62.7-99.3)
Pediatric stethoscope	5	0	(-)	11	90.9	(46.3-99.1)	19	84.2	(57.8-95.4)	17	94.1	(62.7-99.3)
Thermometer	5	40	(3.8-91.9)	11	100	(-)	19	100	(-)	17	100	(-)
Growth / Development card	5	20	(0.8-88.9)	11	90.9	(46.3-99.1)	19	84.2	(57.8-95.4)	17	100	(-)
All drugs observed on day of observation	5	80	(11.1-99.2)	11	100	(-)	19	100	(-)	17	100	(-)
Oral rehydration salts	5	80	(11.1-99.2)	11	100	(-)	19	100	(-)	17	100	(-)
Ferrous sulfate / zinc sulfate / zinc gluconate	5	100	(-)	11	100	(-)	19	100	(-)	17	100	(-)
Albendazole / mebendazole	5	100	(-)	11	100	(-)	19	100	(-)	17	100	(-)
Erythromycin / amoxicillin / penicillin benzathine	5	100	(-)	11	100	(-)	19	100	(-)	17	100	(-)
All drugs continuously available in past three months	5	40	(3.8-91.9)	11	81.8	(42-96.5)	19	84.2	(57.8-95.4)	17	100	(-)
Facility stores vaccines	5	100	(-)	11	90.9	(46.3-99.1)	19	94.7	(66.2-99.4)	17	100	(-)
All vaccines observed on day of survey	5	20	(0.8-88.9)	10	90	(42.2-99.1)	18	94.4	(64.5-99.4)	17	100	(-)
Pentavalent / (DPT + Hep B + HiB)	5	100	(-)	10	100	(-)	18	100	(-)	17	100	(-)
Polio	5	100	(-)	10	100	(-)	18	100	(-)	17	100	(-)
Measles, Mumps, Rubella	5	100	(-)	10	100	(-)	18	100	(-)	17	100	(-)
Rotavirus	5	80	(11.1-99.2)	10	100	(-)	18	100	(-)	17	100	(-)
Pneumococcal conjugate	5	40	(3.8-91.9)	10	90	(42.2-99.1)	18	94.4	(64.5-99.4)	17	100	(-)
BCG	5	20	(0.8-88.9)	10	100	(-)	18	100	(-)	17	100	(-)
All vaccines continuously available in past three months	5	20	(0.8-88.9)	10	80	(37.8-96.3)	18	88.9	(61.1-97.6)	17	94.1	(62.7-99.3)
Child health supplies according to standard (MI7010)	5	0	(-)	11	63.6	(28.8-88.3)	19	52.6	(29.2-75)	17	88.2	(59.1-97.5)

Digital thermometer only captured as alternative to oral/axillary thermometers at second operation evaluation.

Ferrous sulfate three-month stock not captured at baseline.

Vaccine three-month stock only captured for MMR and BCG at baseline and first operation.

DPT + HepB + Hib not captured as Pentavalent alternatives at baseline and first operation.

Kardex data and three month-stock data not captured for all drugs at baseline evaluation.

4.3 Women's health

Data were collected to evaluate both a health facility's capacity to offer women's health care (staff, facilities, equipment, medication), as well as a review of the actual women's health care supplied in antenatal care and cervical cancer screening medical records.

4.3.1 Antenatal care

Interviewers systematically selected antenatal care (ANC) records from ambulatory facilities for women who delivered in the last two years. Timely antenatal care is defined by the performance indicator 3040, which stipulates that the first ANC visit should occur at or before 12 weeks gestation. Timely antenatal care performance improved each measurement round in intervention areas.

The I3040 indicator was first measured at the baseline in which 39.6% of observations met the indicator. In the third operation evaluation period the proportion of observations that met the indicator increased from the baseline with 63.4% of observations meeting the indicator.

Table 4.7: First ANC within 12 weeks (I3040), intervention, ambulatory facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI	N	%	CI
First ANC visit within 12 weeks (I3040)	106	39.6	(30.6-49.4)	371	29.9	(25.5-34.8)	389	51.7	(46.7-56.6)	151	63.6	(55.5-70.9)	262	63.4	(57.3-69)

In addition to the timely antenatal care performance indicator, monitoring indicator 3030 measures whether antenatal care was conducted with quality in more detail. The indicator evaluates whether at least four ANC visits with appropriate checks occurred, and whether certain lab tests were performed at least once during the pregnancy. For a detailed definition of ANC standards required for indicator 3030, see appendix B. While the proportion of patients with at least four antenatal care improved markedly, performance was hampered by a low number of records with a recorded hemoglobin lab test.

Table 4.8: At least four antenatal care (ANC) visits to standard (MI3030), intervention, ambulatory and basic facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI	N	%	CI
At least four ANC visits	135	58.5	(49.9-66.6)	482	30.9	(26.9-35.2)	490	37.8	(33.6-42.1)	178	70.8	(63.6-77.1)	301	68.8	(63.3-73.8)
All appropriate checks performed, at least four ANC visits	135	57	(48.5-65.2)	482	28.8	(25-33.1)	490	32.2	(28.2-36.5)	178	65.7	(58.4-72.4)	301	61.8	(56.1-67.1)
All lab tests performed at least once during pregnancy:															
Blood group	135	61.5	(52.9-69.4)	482	72.4	(68.2-76.2)	490	18	(14.8-21.6)	178	20.2	(14.9-26.8)	301	22.3	(17.9-27.3)
Rh factor	135	78.5	(70.7-84.7)	482	80.7	(76.9-84)	490	41.4	(37.1-45.9)	178	66.3	(59-72.9)	301	66.8	(61.2-71.9)
	135	77.8	(69.9-84.1)	482	80.5	(76.7-83.8)	490	41.4	(37.1-45.9)	178	66.3	(59-72.9)	301	66.8	(61.2-71.9)

	Baseline			1st Operation			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Blood glucose	135	68.9	(60.5-76.2)	482	76.8	(72.8-80.3)	490	34.1	(30-38.4)	178	53.4	(46-60.6)	301	58.1	(52.5-63.6)
HIV test	0			482	91.3	(88.4-93.5)	490	40.4	(36.1-44.8)	178	65.7	(58.4-72.4)	301	63.1	(57.5-68.4)
Syphilis test (VDRL / RPR*)	135	74.1	(65.9-80.8)	482	76.8	(72.8-80.3)	490	35.3	(31.2-39.7)	178	50.6	(43.2-57.9)	301	52.2	(46.5-57.8)
Hemoglobin	135	75.6	(67.5-82.1)	482	78.6	(74.7-82.1)	490	29.6	(25.7-33.8)	178	39.3	(32.4-46.8)	301	33.6	(28.4-39.1)
Urinalysis	135	74.8	(66.7-81.5)	482	87.1	(83.8-89.9)	490	34.9	(30.8-39.2)	178	61.8	(54.4-68.7)	301	59.1	(53.5-64.6)
Antenatal care performed according to standard (MI3030)	135	38.5	(30.6-47.1)	482	20.1	(16.8-24)	490	11.2	(8.7-14.3)	178	16.3	(11.5-22.5)	301	16.9	(13.1-21.6)

As part of the Health Facility Observation, interviewers systematically observed equipment and medication necessary to provide antenatal and postnatal care services, as defined by the monitoring indicator 7020. The indicator is measured at ambulatory and basic facilities that provide the relevant services. For a detailed definition of requirements for indicator 7020, see appendix B.

Table 4.9: Pre/postnatal care services (MI7020), intervention, ambulatory facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
All antenatal/postpartum equipment observed and functional	32	31.3	(17.1-50)	45	75.6	(60.4-86.2)	37	73	(55.8-85.3)	20	75	(49.7-90.1)
Standing scale with height rod	32	90.6	(73.3-97.1)	45	97.8	(84.9-99.7)	37	97.3	(81.7-99.7)	20	100	(-)
Gynecological table	32	90.6	(73.3-97.1)	45	97.8	(84.9-99.7)	37	97.3	(81.7-99.7)	20	95	(67.7-99.4)
Lamp	32	53.1	(35.2-70.2)	45	82.2	(67.6-91.1)	37	78.4	(61.5-89.2)	20	80	(54.6-93)
CLAP / measuring tape	32	81.2	(62.9-91.7)	45	100	(-)	37	100	(-)	20	100	(-)
Sphygmomanometer	32	87.5	(69.8-95.5)	45	97.8	(84.9-99.7)	37	100	(-)	20	95	(67.7-99.4)
Stethoscope	32	90.6	(73.3-97.1)	45	97.8	(84.9-99.7)	37	100	(-)	20	95	(67.7-99.4)
Pregnancy wheel	32	81.2	(62.9-91.7)	45	95.6	(83.1-98.9)	37	94.6	(79.7-98.7)	20	95	(67.7-99.4)
Antenatal/postpartum care supplies according to standard (MI7020)	32	31.3	(17.1-50)	45	73.3	(58-84.5)	37	73	(55.8-85.3)	20	75	(49.7-90.1)

Table 4.10: Pre/postnatal care services (MI7020), intervention, basic facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
All antenatal/postpartum equipment observed and functional	5	0	(-)	11	90.9	(46.3-99.1)	20	75	(49.7-90.1)	18	77.8	(50.5-92.3)
Standing scale with height rod	5	80	(11.1-99.2)	11	100	(-)	20	90	(64.5-97.8)	18	94.4	(64.5-99.4)
Gynecological table	5	100	(-)	11	100	(-)	20	100	(-)	18	100	(-)

	Baseline			1st Operation			2nd Operation			3rd Operation		
Lamp	5	80	(11.1-99.2)	11	90.9	(46.3-99.1)	20	95	(67.7-99.4)	18	100	(-)
CLAP / measuring tape	5	40	(3.8-91.9)	11	100	(-)	20	100	(-)	18	100	(-)
Sphygmomanometer	5	100	(-)	11	100	(-)	20	100	(-)	18	94.4	(64.5-99.4)
Stethoscope	5	100	(-)	11	100	(-)	20	100	(-)	18	94.4	(64.5-99.4)
Pregnancy wheel	5	20	(0.8-88.9)	11	100	(-)	20	90	(64.5-97.8)	18	88.9	(61.1-97.6)
Intrauterine device kit	5	20	(0.8-88.9)	11	100	(-)	20	95	(67.7-99.4)	18	100	(-)
All lab inputs observed	5	0	(-)	11	90.9	(46.3-99.1)	20	80	(54.6-93)	18	94.4	(64.5-99.4)
Rapid HIV test	5	40	(3.8-91.9)	11	100	(-)	20	90	(64.5-97.8)	18	100	(-)
Rapid syphilis test	5	60	(8.1-96.2)	11	90.9	(46.3-99.1)	20	80	(54.6-93)	18	94.4	(64.5-99.4)
Serological mixer	0			11	100	(-)	20	90	(64.5-97.8)	18	83.3	(55.9-95.2)
Urine analysis	0			11	100	(-)	20	90	(64.5-97.8)	18	94.4	(64.5-99.4)
Glucose test	5	100	(-)	11	100	(-)	20	100	(-)	18	100	(-)
Blood test equipment	0			11	100	(-)	20	100	(-)	18	100	(-)
Microscope	0			11	100	(-)	20	100	(-)	18	100	(-)
Automated cell counter	5	100	(-)	11	100	(-)	20	100	(-)	18	100	(-)
Antenatal/postpartum care supplies according to standard (MI7020)	5	0	(-)	11	90.9	(46.3-99.1)	20	60	(36-80)	18	72.2	(45.3-89.1)

Serological mixer, urine analysis, blood analysis equipment, and microscope not captured at baseline.

4.3.2 Cervical cancer screening

Interviewers systematically selected routine care records of women aged 25-49 from ambulatory facilities to evaluate the presence and quality of cervical cancer screenings. This module was introduced for the third operation survey to measure recent cervical cancer screening interventions implemented through SMI, and therefore has no data from previous operations. Records are evaluated for the recency and quantity of various types of screenings including Papanicolaou test (Pap smear), human papillomavirus (HPV) screening, and visual inspection of the cervix with acetic acid (VIAA). In the case of positive screening results, records are evaluated for proper follow-up and referral practices. For a detailed definition of cervical cancer screening standards required for indicator 6005, see appendix B.

Table 4.11: Cervical cancer screening with quality (I6005), intervention, ambulatory facilities

Description	3rd Operation: Evaluation		
	N	%	CI
Evidence of any HPV screening?	208	1	(0.2-3.8)
HPV screening date recorded	2	100	(-)
Most recent HPV screening within 5 years	2	100	(-)
Negative HPV result in past 5 years	2	50	(0-100)

	3rd Operation: Evaluation		
Most recent HPV screening within past year	2	100	(-)
Positive HPV result in past year	2	0	(-)
Date of positive HPV result notification recorded	0		
Notification of positive HPV result within 30 days of lab result	0		
Evidence notification was received	0		
All requirements for positive HPV result in past year met	0		
HPV result not recorded	2	50	(0-100)
HPV screening to standard (positive or negative)	2	50	(0-100)
Evidence of any VIAA screening?	208	13.5	(9.4-18.9)
VIAA screening date recorded	28	96.4	(76.3-99.6)
Most recent VIAA screening within 3 years	28	96.4	(76.3-99.6)
Negative VIAA result in past 3 years	27	37	(20.3-57.5)
Most recent VIAA screening within past year	28	67.9	(47.5-83.1)
Positive VIAA result in past year	19	0	(-)
Date of positive VIAA result notification recorded	0		
Notification of positive VIAA result within 30 days of screening	0		
Evidence notification was received	0		
All requirements for positive VIAA result in past year met	0		
VIAA result not recorded	28	60.7	(40.8-77.6)
VIAA screening to standard (positive or negative)	28	35.7	(19.6-55.9)
Evidence of any PAP screening?	208	97.1	(93.7-98.7)
PAP screening date recorded	202	100	(-)
Most recent PAP screening within 4 years	202	99.5	(96.5-99.9)
Negative PAP result (most recent) in past 4 years	201	92	(87.4-95.1)
At least three PAP screenings registered, if most recent negative result > 1 year ago	36	2.8	(0.4-18.7)
All requirements for negative PAP result in past four years met	185	81.1	(74.7-86.1)
Most recent PAP screening within past year	202	80.2	(74.1-85.2)
Positive PAP result in past year	162	3.7	(1.7-8.1)
Date of positive PAP result notification recorded	6	66.7	(14.9-95.8)
Notification of positive PAP result within 30 days of lab result	6	66.7	(14.9-95.8)
Evidence notification was received	6	66.7	(14.9-95.8)
All requirements for positive PAP result in past year met	6	66.7	(14.9-95.8)
PAP result not recorded	202	12.4	(8.5-17.7)
PAP screening to standard (positive or negative)	202	76.2	(69.8-81.6)
No evidence of screening in record	208	1	(0.2-3.8)
Cervical cancer screening with quality (I6005)	208	76.9	(70.7-82.2)

4.3.3 Contraception

Monitoring indicator 7050 measures the stock of contraceptive supplies at ambulatory and basic facilities that store contraceptives using data from the Health Facility Observation. Availability on the day of the survey as well as continuous three month supply of various contraceptives was evaluated. For a detailed definition of items required for indicator 7050, see appendix B.

Table 4.12: Contraceptive services (MI7050), intervention, ambulatory facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
All methods observed day of survey	32	68.7	(50-82.9)	45	95.6	(83.1-98.9)	36	83.3	(66.6-92.6)	20	100	(-)
Male condom	32	78.1	(59.6-89.7)	45	97.8	(84.9-99.7)	36	97.2	(81.3-99.6)	20	100	(-)
Oral contraceptive pill	32	81.2	(62.9-91.7)	45	97.8	(84.9-99.7)	36	86.1	(69.7-94.4)	20	100	(-)
Injectable	32	96.9	(79.1-99.6)	45	100	(-)	36	91.7	(76.1-97.4)	20	100	(-)
All methods continuously available in past three months	32	59.4	(40.9-75.5)	45	86.7	(72.7-94.1)	36	80.6	(63.5-90.8)	20	100	(-)
Contraceptive services according to standard (MI7050)	32	59.4	(40.9-75.5)	45	86.7	(72.7-94.1)	36	80.6	(63.5-90.8)	20	100	(-)

Table 4.13: Contraceptive services (MI7050), intervention, basic facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
All methods observed day of survey	5	60	(8.1-96.2)	11	100	(-)	18	83.3	(55.9-95.2)	18	94.4	(64.5-99.4)
Male condom	5	80	(11.1-99.2)	11	100	(-)	18	88.9	(61.1-97.6)	18	100	(-)
Oral contraceptive pill	5	60	(8.1-96.2)	11	100	(-)	18	83.3	(55.9-95.2)	18	94.4	(64.5-99.4)
Injectable	5	100	(-)	11	100	(-)	18	88.9	(61.1-97.6)	18	100	(-)
Intrauterine device	5	80	(11.1-99.2)	11	100	(-)	18	94.4	(64.5-99.4)	18	94.4	(64.5-99.4)
All methods continuously available in past three months	5	60	(8.1-96.2)	11	90.9	(46.3-99.1)	18	61.1	(35.5-81.8)	18	88.9	(61.1-97.6)
Contraceptive services according to standard (MI7050)	5	60	(8.1-96.2)	11	90.9	(46.3-99.1)	18	61.1	(35.5-81.8)	18	88.9	(61.1-97.6)

IUD three-month stock not captured at baseline.

IUD kardex not captured at first follow-up.

4.4 Obstetric care

Data were collected to evaluate both a health facility's capacity to offer obstetric care (staff, facilities, equipment, medication), as well as a review of the actual obstetric care supplied in delivery, postpartum care, and obstetric complication medical records.

4.4.1 Routine delivery

Interviewers reviewed uncomplicated delivery records in the past two years to evaluate successful partograph completion according to the standards defined by monitoring indicator 4065. The indicator stipulates that a full partograph be included in the medical record, and that specified actions should be taken in response to certain events during the course of labor. For a detailed definition of indicator 4065, see appendix B.

Table 4.14: Partograph completion for uncomplicated deliveries (MI4065), intervention, basic and complete facilities

Description	1st Operation			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Imminent birth or elective C-section	220	73.6	(67.4-79.1)	316	77.5	(72.6-81.8)	116	47.4	(38.4-56.6)	173	56.1	(48.5-63.3)
Partograph included and filled out	220	60	(53.3-66.3)	316	82	(77.3-85.8)	116	78.4	(69.9-85.1)	173	72.3	(65-78.5)
Dilation > 4.5cm	132	69.7	(61.2-77)	259	45.9	(39.9-52.1)	91	44	(34-54.5)	125	36.8	(28.7-45.7)
Fetal heart rate and alert curve recorded if dilation > 4.5cm	92	97.8	(91.5-99.5)	119	99.2	(94.1-99.9)	40	90	(75.4-96.4)	46	100	(-)
Alert curve surpassed	132	9.1	(5.2-15.4)	259	16.6	(12.5-21.7)	91	2.2	(0.5-8.6)	125	0.8	(0.1-5.6)
Note exists within 30 minutes if alert curve surpassed	12	58.3	(26.7-84.3)	43	72.1	(56.3-83.8)	2	50	(0-100)	1	100	(-)
Fetal heart rate < 120 bpm	132	3.8	(1.6-8.9)	259	1.2	(0.4-3.6)	91	2.2	(0.5-8.6)	125	0.8	(0.1-5.6)
Note exists within 30 minutes if fetal heart rate < 120 bpm	5	20	(0.8-88.9)	3	0	(-)	2	0	(-)	1	0	(-)
Partograph revised according to standard (MI4065)	220	92.7	(88.4-95.5)	316	90.8	(87.1-93.6)	116	81	(72.7-87.3)	173	89	(83.4-92.9)

In addition to partograph revision, delivery records were reviewed to evaluate the active management of the third stage of labor (AMTSL), as specified by the monitoring indicator 4095. AMTSL requires that oxytocin or another uterotonic be administered, and that the record includes evidence of when the administration occurred. For a detailed definition of indicator 4095, see appendix B.

Table 4.15: Active management of the third stage of labor (MI4095), intervention, basic and complete facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Oxytocin administered	90	96.7	(90-98.9)	210	82.4	(76.6-87)	316	93.7	(90.4-95.9)	116	94.8	(88.8-97.7)	172	97.1	(93.2-98.8)
Other uterotonic administered	90	3.3	(1.1-10)	186	1.6	(0.5-4.9)	316	0.6	(0.2-2.5)	116	9.5	(5.3-16.4)	172	8.7	(5.3-14)
Active management of third stage of labor according to standard (MI4095)	90	83.3	(74-89.8)	210	64.8	(58-71)	316	86.4	(82.1-89.8)	116	89.7	(82.5-94.1)	172	87.2	(81.3-91.5)

During the Health Facility Observation, interviewers observed the delivery area of *Centro de Salud* basic facilities to evaluate for sociocultural accommodations available to patients, as specified by monitoring indicator 8870. These accommodations include, for example, the use of indigenous languages, the permitted accompaniment of relatives or other community members, and patient self-determination of the position and dress during delivery. For a detailed definition of indicator 8870, see appendix B.

Table 4.16: Sociocultural conditions (MI8870), intervention, Centros de Salud

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Services adapt to sociocultural conditions (MI8870)	3	100	(-)	7	71.4	(21.5-95.8)	8	87.5	(31.9-99.1)	7	100	(-)

Monitoring indicator 4050 specifies the standards for appropriate postpartum care within two hours after birth, as measured from postpartum care medical records for deliveries in the past two years. The indicator requires that certain checks be performed at least four times in the first two hours, and once at discharge. For a detailed definition of indicator 4050, see appendix B.

Table 4.17: Maternal postpartum care within two hours after birth (MI4050), intervention, basic and complete facilities

Description	1st Operation			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Blood pressure checked at least four times	166	64.5	(56.8-71.4)	267	87.3	(82.7-90.8)	81	85.2	(75.5-91.5)	119	73.9	(65.2-81.1)
Temperature checked at least four times	166	50	(42.4-57.6)	267	87.3	(82.7-90.8)	81	85.2	(75.5-91.5)	119	73.1	(64.3-80.4)
Heart rate / pulse checked at least four times	166	50	(42.4-57.6)	267	85	(80.2-88.8)	81	85.2	(75.5-91.5)	119	73.9	(65.2-81.1)
All checks at discharge	166	86.7	(80.6-91.2)	267	85.4	(80.6-89.2)	81	80.2	(69.9-87.7)	119	88.2	(81-93)
Immediate postpartum care to standard (MI4050)	166	45.2	(37.7-52.9)	267	73.8	(68.1-78.7)	81	69.1	(58-78.4)	119	65.5	(56.5-73.6)

4.4.2 Management of obstetric complications

Interviewers evaluated records of obstetric complications (hemorrhage, severe pre-eclampsia, eclampsia, sepsis) that were systematically sampled by IHME from electronic discharge registries provided by the Ministry of Health at basic and complete facilities. These records were used to evaluate quality of care, as defined by the obstetric complications performance indicator 4080 (see appendix B for detailed definitions of the care requirements for indicator 4080). Note that some records may have been evaluated for multiple obstetric complications.

The I4080 indicator was first measured at the baseline in which 36.8% of observations met the indicator. In the third operation evaluation period the proportion of observations that met the indicator increased from the baseline with 44.5% of observations meeting the indicator.

Table 4.18: Management of obstetric complications (I4080), intervention, basic and complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Sepsis managed to standard	27	66.7	(46-82.5)	42	73.8	(57.9-85.2)	9	100	(-)	9	55.6	(19.5-86.6)
Hemorrhage managed to standard	99	49.5	(39.6-59.4)	133	67.7	(59.2-75.2)	69	69.6	(57.5-79.5)	101	65.3	(55.4-74.1)
Pre-eclampsia managed to standard	71	11.3	(5.6-21.3)	116	10.3	(5.9-17.5)	50	8	(2.9-20)	97	28.9	(20.6-38.8)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Eclampsia managed to standard	8	0	(-)	11	18.2	(3.5-58)	9	0	(-)	21	23.8	(9.5-48.3)
Management of obstetric complications (I4080)	204	36.8	(30.4-43.7)	301	44.9	(39.3-50.5)	131	44.3	(35.9-53)	218	44.5	(38-51.2)

Sepsis cases are evaluated as one component of the obstetric complications indicator 4080. Table 4.19 and Table 4.20 below display sepsis management practices in each operation measurement. For a detailed definition of the standards required for appropriate sepsis management, see appendix B.

Table 4.19: Management of obstetric complications (I4080), sepsis, intervention, basic facilities

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Description	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked:	17	94.1	(62.7-99.3)	34	94.1	(78-98.6)	7	100	(-)	4	100	(-)
Pulse / heart rate	17	100	(-)	34	97.1	(80.2-99.6)	7	100	(-)	4	100	(-)
Blood pressure	17	100	(-)	34	97.1	(80.2-99.6)	7	100	(-)	4	100	(-)
Temperature	17	94.1	(62.7-99.3)	34	100	(-)	7	100	(-)	4	100	(-)
Antibiotics administered	17	88.2	(59.1-97.5)	34	97.1	(80.2-99.6)	7	100	(-)	4	100	(-)
Causes treated appropriately:	7	71.4	(21.5-95.8)	13	76.9	(42.8-93.7)	1	100	(-)	2	100	(-)
Pelvic abscess	0			1	0	(-)	0			0		
Retained product	3	33.3	(0.1-99.7)	5	40	(3.8-91.9)	0			0		
Postpartum endometritis	4	100	(-)	8	100	(-)	1	100	(-)	2	100	(-)
Obstetric sepsis managed to standard	17	76.5	(48.2-91.9)	34	82.4	(64.8-92.2)	7	100	(-)	4	100	(-)

Table 4.20: Management of obstetric complications (I4080), sepsis, intervention, complete facilities

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Description	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked:	10	100	(-)	8	100	(-)	2	100	(-)	5	100	(-)
Pulse / heart rate	10	100	(-)	8	100	(-)	2	100	(-)	5	100	(-)
Blood pressure	10	100	(-)	8	100	(-)	2	100	(-)	5	100	(-)
Temperature	10	100	(-)	8	100	(-)	2	100	(-)	5	100	(-)
Lab tests (blood biometry):	10	50	(18.1-81.9)	8	37.5	(8.7-79.2)	2	100	(-)	5	20	(0.8-88.9)
Leukocyte count	10	90	(42.2-99.1)	8	87.5	(31.9-99.1)	2	100	(-)	5	100	(-)
Platelet count	10	60	(24.3-87.5)	8	75	(27.6-95.9)	2	100	(-)	5	100	(-)
Hemoglobin	10	50	(18.1-81.9)	8	37.5	(8.7-79.2)	2	100	(-)	5	20	(0.8-88.9)
Hematocrit	10	90	(42.2-99.1)	8	87.5	(31.9-99.1)	2	100	(-)	5	100	(-)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Antibiotics administered	10	100	(-)	8	87.5	(31.9-99.1)	2	100	(-)	5	100	(-)
Causes treated appropriately:	6	100	(-)	5	80	(11.1-99.2)	1	100	(-)	2	100	(-)
Pelvic abscess	0			0			0			0		
Retained product	1	100	(-)	1	0	(-)	1	100	(-)	0		
Postpartum endometritis	6	100	(-)	4	100	(-)	1	100	(-)	2	100	(-)
Obstetric sepsis managed to standard	10	50	(18.1-81.9)	8	37.5	(8.7-79.2)	2	100	(-)	5	20	(0.8-88.9)

Hemorrhage cases are evaluated as one component of the obstetric complications indicator 4080. Table 4.21 and Table 4.22 below display hemorrhage management practices in each operation measurement. For a detailed definition of the standards required for appropriate hemorrhage management, see appendix B.

Table 4.21: Management of obstetric complications (I4080), hemorrhage, intervention, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked:	54	92.6	(81.4-97.3)	114	97.4	(92-99.2)	52	94.2	(83-98.2)	79	91.1	(82.3-95.8)
Pulse / heart rate	54	92.6	(81.4-97.3)	114	99.1	(93.9-99.9)	52	94.2	(83-98.2)	79	91.1	(82.3-95.8)
Blood pressure	54	98.1	(87.3-99.8)	114	97.4	(92-99.2)	52	100	(-)	79	100	(-)
Ringer's lactate / Hartmann's / saline solution administered	54	83.3	(70.5-91.3)	114	84.2	(76.2-89.9)	52	82.7	(69.4-90.9)	79	86.1	(76.3-92.2)
Causes treated appropriately:	32	78.1	(59.6-89.7)	60	65	(51.8-76.2)	38	81.6	(65.2-91.3)	62	88.7	(77.8-94.6)
Abortion	2	50	(0-100)	1	100	(-)	0			1	100	(-)
Ectopic pregnancy	0			1	100	(-)	0			0		
Placenta previa	2	100	(-)	1	100	(-)	4	75	(4.1-99.5)	5	100	(-)
Placental abruption	0			1	100	(-)	1	100	(-)	1	100	(-)
Uterine rupture	0			2	100	(-)	1	100	(-)	0		
Uterine atony	6	100	(-)	9	66.7	(26.2-91.9)	20	80	(54.6-93)	44	93.2	(80.1-97.9)
Uterine inversion	0			1	100	(-)	0			0		
Retained product	23	73.9	(50.9-88.6)	45	60	(44.7-73.6)	21	85.7	(61.3-95.8)	24	83.3	(61.1-94.1)
Hemorrhage managed to standard	54	75.9	(62.3-85.7)	114	70.2	(61-78)	52	69.2	(55-80.5)	79	72.2	(61-81.1)

Table 4.22: Management of obstetric complications (I4080), hemorrhage, intervention, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked:	45	100	(-)	19	100	(-)	17	100	(-)	22	100	(-)
Pulse / heart rate	45	100	(-)	19	100	(-)	17	100	(-)	22	100	(-)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Blood pressure	45	100	(-)	19	100	(-)	17	100	(-)	22	100	(-)
Ringer's lactate / Hartmann's / saline solution administered	45	93.3	(80.6-97.9)	19	84.2	(57.8-95.4)	17	94.1	(62.7-99.3)	22	90.9	(67.3-98)
Lab tests:	45	20	(10.5-34.8)	19	63.2	(38-82.7)	17	88.2	(59.1-97.5)	22	54.5	(32.5-74.9)
Hematocrit	45	88.9	(75.3-95.5)	19	100	(-)	17	100	(-)	22	100	(-)
Hemoglobin	45	20	(10.5-34.8)	19	63.2	(38-82.7)	17	88.2	(59.1-97.5)	22	54.5	(32.5-74.9)
Platelet count	45	80	(65.2-89.5)	19	100	(-)	17	100	(-)	22	100	(-)
Causes treated appropriately:	18	94.4	(64.5-99.4)	12	75	(39.3-93.3)	13	69.2	(36.5-89.8)	16	81.2	(51.4-94.7)
Abortion	1	100	(-)	0			0			0		
Ectopic pregnancy	0			0			0			0		
Placenta previa	4	75	(4.1-99.5)	2	100	(-)	1	100	(-)	3	100	(-)
Placental abruption	2	100	(-)	2	100	(-)	1	100	(-)	0		
Uterine rupture	0			0			1	100	(-)	1	100	(-)
Uterine atony	1	100	(-)	2	50	(0-100)	9	77.8	(33-96.1)	11	81.8	(42-96.5)
Uterine inversion	1	100	(-)	1	100	(-)	0			0		
Retained product	9	100	(-)	5	60	(8.1-96.2)	3	0	(-)	3	66.7	(0.3-99.9)
Hemorrhage managed to standard	45	17.8	(8.9-32.4)	19	52.6	(29.2-75)	17	70.6	(42.9-88.5)	22	40.9	(21.6-63.5)

Pre-eclampsia cases are evaluated as one component of the obstetric complications indicator 4080. Table 4.23, Table 4.24, and Table 4.25 below display pre-eclampsia management practices in each operation measurement. Because requirements at basic facilities differ based on whether the patient was referred or not, separate tables are displayed for referred and non-referred cases. For a detailed definition of the standards required for appropriate pre-eclampsia management, see appendix B.

Table 4.23: Management of obstetric complications (I4080), pre-eclampsia, intervention, basic facilities, referred

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	7	85.7	(25.7-99)	18	100	(-)	7	100	(-)	20	100	(-)
Pulse / heart rate	7	100	(-)	18	100	(-)	7	100	(-)	20	100	(-)
Blood pressure	7	100	(-)	18	100	(-)	7	100	(-)	20	100	(-)
Respiratory rate	7	85.7	(25.7-99)	18	100	(-)	7	100	(-)	20	100	(-)
Urine protein	7	71.4	(21.5-95.8)	18	88.9	(61.1-97.6)	7	57.1	(15-90.9)	20	80	(54.6-93)
All appropriate medications administered	7	85.7	(25.7-99)	18	72.2	(45.3-89.1)	7	57.1	(15-90.9)	20	65	(40.4-83.6)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Magnesium sulfate	7	85.7	(25.7-99)	18	77.8	(50.5-92.3)	7	57.1	(15-90.9)	20	65	(40.4-83.6)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	2	100	(-)	4	75	(4.1-99.5)	1	100	(-)	0		
Pre-eclampsia managed to standard	7	42.9	(9.1-85)	18	66.7	(40.3-85.6)	7	28.6	(4.2-78.5)	20	50	(27.7-72.3)

Table 4.24: Management of obstetric complications (I4080), pre-eclampsia, intervention, basic facilities, not referred

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Description	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	18	100	(-)	51	94.1	(82.7-98.2)	28	96.4	(76.3-99.6)	49	98	(86-99.7)
Pulse / heart rate	18	100	(-)	51	96.1	(85-99.1)	28	96.4	(76.3-99.6)	49	98	(86-99.7)
Blood pressure	18	100	(-)	51	96.1	(85-99.1)	28	100	(-)	49	100	(-)
Respiratory rate	18	100	(-)	51	96.1	(85-99.1)	28	96.4	(76.3-99.6)	49	98	(86-99.7)
Lab tests	18	0	(-)	51	0	(-)	28	7.1	(1.6-26.3)	49	24.5	(14.2-38.9)
Urine protein	18	55.6	(30.9-77.8)	51	52.9	(38.9-66.5)	28	71.4	(51.1-85.7)	49	79.6	(65.5-88.9)
Platelet count	18	11.1	(2.4-38.9)	51	56.9	(42.6-70.1)	28	85.7	(66-94.9)	49	91.8	(79.6-97)
Creatine	18	11.1	(2.4-38.9)	51	49	(35.3-62.9)	28	75	(54.7-88.2)	49	81.6	(67.7-90.4)
Uric acid	18	0	(-)	51	25.5	(15.1-39.6)	28	64.3	(44.1-80.4)	49	63.3	(48.5-75.9)
Aspartate aminotransferase / glutamic-oxalacetic transaminase	18	0	(-)	51	45.1	(31.7-59.2)	28	64.3	(44.1-80.4)	49	77.6	(63.3-87.4)
Alanine transaminase / glutamic-pyruvic transaminase	18	0	(-)	51	45.1	(31.7-59.2)	28	64.3	(44.1-80.4)	49	77.6	(63.3-87.4)
Lactate dehydrogenase	18	5.6	(0.6-35.5)	51	0	(-)	28	14.3	(5.1-34)	49	34.7	(22.4-49.4)
All appropriate medications administered	18	38.9	(18.2-64.5)	51	54.9	(40.8-68.3)	28	53.6	(34.3-71.8)	49	55.1	(40.6-68.7)
Magnesium sulfate	18	38.9	(18.2-64.5)	51	56.9	(42.6-70.1)	28	53.6	(34.3-71.8)	49	55.1	(40.6-68.7)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	2	100	(-)	6	66.7	(14.9-95.8)	6	100	(-)	7	100	(-)
Pre-eclampsia managed to standard (I4080)	18	0	(-)	51	0	(-)	28	7.1	(1.6-26.3)	49	16.3	(8.2-30)

Table 4.25: Management of obstetric complications (I4080), pre-eclampsia, intervention, complete facilities

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Description	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	39	69.2	(52.5-82.1)	47	51.1	(36.6-65.4)	15	33.3	(12.9-62.8)	28	64.3	(44.1-80.4)
Pulse / heart rate	39	100	(-)	47	100	(-)	15	100	(-)	28	100	(-)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Blood pressure	39	100	(-)	47	100	(-)	15	100	(-)	28	100	(-)
Respiratory rate	39	100	(-)	47	97.9	(85.5-99.7)	15	86.7	(54.6-97.2)	28	96.4	(76.3-99.6)
Patellar reflex	39	69.2	(52.5-82.1)	47	53.2	(38.5-67.3)	15	46.7	(21.7-73.4)	28	64.3	(44.1-80.4)
Lab tests	39	15.4	(6.8-31.1)	47	14.9	(7.1-28.7)	15	20	(5.6-51.2)	28	50	(31.2-68.8)
Urine protein	39	82.1	(66-91.5)	47	74.5	(59.6-85.2)	15	46.7	(21.7-73.4)	28	85.7	(66-94.9)
Platelet count	39	89.7	(74.8-96.3)	47	91.5	(78.8-96.9)	15	80	(48.8-94.4)	28	100	(-)
Creatine	39	66.7	(49.9-80.1)	47	76.6	(61.9-86.8)	15	93.3	(58.4-99.3)	28	96.4	(76.3-99.6)
Uric acid	39	43.6	(28.5-60)	47	44.7	(30.8-59.5)	15	73.3	(42.9-91)	28	82.1	(62.1-92.8)
Aspartate aminotransferase / glutamic-oxalacetic transaminase	39	79.5	(63.2-89.7)	47	68.1	(53-80.1)	15	86.7	(54.6-97.2)	28	89.3	(69.9-96.8)
Alanine transaminase / glutamic-pyruvic transaminase	39	76.9	(60.5-87.9)	47	68.1	(53-80.1)	15	86.7	(54.6-97.2)	28	89.3	(69.9-96.8)
Lactate dehydrogenase	39	30.8	(17.9-47.5)	47	46.8	(32.7-61.5)	15	73.3	(42.9-91)	28	75	(54.7-88.2)
All appropriate medications administered	39	87.2	(71.8-94.8)	47	57.4	(42.6-71.1)	15	60	(31.8-82.9)	28	78.6	(58.3-90.6)
Magnesium sulfate	39	87.2	(71.8-94.8)	47	57.4	(42.6-71.1)	15	66.7	(37.2-87.1)	28	78.6	(58.3-90.6)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	14	100	(-)	6	100	(-)	4	75	(4.1-99.5)	5	100	(-)
Pre-eclampsia managed to standard (I4080)	39	12.8	(5.2-28.2)	47	0	(-)	15	0	(-)	28	35.7	(19.6-55.9)

Eclampsia cases are evaluated as one component of the obstetric complications indicator 4080. Table 4.26, Table 4.27, and Table 4.28 below display eclampsia management practices in each operation measurement. Because requirements at basic facilities differ based on whether the patient was referred or not, separate tables are displayed for referred and non-referred cases. For a detailed definition of the standards required for appropriate eclampsia management, see appendix B.

Table 4.26: Management of obstetric complications (I4080), eclampsia, intervention, basic facilities, referred

Description	2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	4	100	(-)	1	100	(-)	5	100	(-)
Pulse / heart rate	4	100	(-)	1	100	(-)	5	100	(-)
Blood pressure	4	100	(-)	1	100	(-)	5	100	(-)
Respiratory rate	4	100	(-)	1	100	(-)	5	100	(-)
Urine protein	4	50	(2.5-97.5)	1	0	(-)	5	40	(3.8-91.9)
All appropriate medications administered	4	50	(2.5-97.5)	1	100	(-)	5	80	(11.1-99.2)
Magnesium sulfate	4	50	(2.5-97.5)	1	100	(-)	5	100	(-)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	0			0			1	0	(-)

	2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Eclampsia managed according to SMI standard (I4080)	4	50	(2.5-97.5)	1	0	(-)	5	20	(0.8-88.9)

Table 4.27: Management of obstetric complications (I4080), eclampsia, intervention, basic facilities, not referred

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	2	100	(-)	2	100	(-)	4	50	(2.5-97.5)	8	100	(-)
Pulse / heart rate	2	100	(-)	2	100	(-)	4	75	(4.1-99.5)	8	100	(-)
Blood pressure	2	100	(-)	2	100	(-)	4	75	(4.1-99.5)	8	100	(-)
Respiratory rate	2	100	(-)	2	100	(-)	4	50	(2.5-97.5)	8	100	(-)
Lab tests	2	0	(-)	2	0	(-)	4	0	(-)	8	50	(14.3-85.7)
Urine protein	2	0	(-)	2	50	(0-100)	4	75	(4.1-99.5)	8	62.5	(20.8-91.3)
Platelet count	2	50	(0-100)	2	100	(-)	4	100	(-)	8	100	(-)
Creatine	2	50	(0-100)	2	100	(-)	4	25	(0.5-95.9)	8	87.5	(31.9-99.1)
Uric acid	2	50	(0-100)	2	50	(0-100)	4	25	(0.5-95.9)	8	62.5	(20.8-91.3)
Aspartate aminotransferase / glutamic-oxalacetic transaminase	2	0	(-)	2	100	(-)	4	25	(0.5-95.9)	8	87.5	(31.9-99.1)
Alanine transaminase / glutamic-pyruvic transaminase	2	0	(-)	2	100	(-)	4	25	(0.5-95.9)	8	87.5	(31.9-99.1)
Lactate dehydrogenase	2	0	(-)	2	0	(-)	4	0	(-)	8	50	(14.3-85.7)
All appropriate medications administered	2	100	(-)	2	100	(-)	4	100	(-)	8	75	(27.6-95.9)
Magnesium sulfate	2	100	(-)	2	100	(-)	4	100	(-)	8	75	(27.6-95.9)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	1	100	(-)	2	100	(-)	0			2	100	(-)
Eclampsia managed according to SMI standard (I4080)	2	0	(-)	2	0	(-)	4	0	(-)	8	37.5	(8.7-79.2)

Table 4.28: Management of obstetric complications (I4080), eclampsia, intervention, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	5	20	(0.8-88.9)	5	40	(3.8-91.9)	4	0	(-)	8	12.5	(0.9-68.1)
Pulse / heart rate	5	100	(-)	5	100	(-)	4	100	(-)	8	100	(-)
Blood pressure	5	100	(-)	5	100	(-)	4	100	(-)	8	100	(-)
Respiratory rate	5	100	(-)	5	100	(-)	4	100	(-)	8	62.5	(20.8-91.3)
Patellar reflex (complete only)	5	20	(0.8-88.9)	5	40	(3.8-91.9)	4	0	(-)	8	25	(4.1-72.4)
Lab tests	5	20	(0.8-88.9)	5	0	(-)	4	0	(-)	8	37.5	(8.7-79.2)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Urine protein	5	60	(8.1-96.2)	5	60	(8.1-96.2)	4	25	(0.5-95.9)	8	87.5	(31.9-99.1)
Platelet count	5	60	(8.1-96.2)	5	100	(-)	4	100	(-)	8	100	(-)
Creatine	5	80	(11.1-99.2)	5	100	(-)	4	100	(-)	8	87.5	(31.9-99.1)
Uric acid	5	60	(8.1-96.2)	5	60	(8.1-96.2)	4	75	(4.1-99.5)	8	50	(14.3-85.7)
Aspartate aminotransferase / glutamic-oxalacetic transaminase	5	80	(11.1-99.2)	5	60	(8.1-96.2)	4	50	(2.5-97.5)	8	87.5	(31.9-99.1)
Alanine transaminase / glutamic-pyruvic transaminase	5	80	(11.1-99.2)	5	60	(8.1-96.2)	4	50	(2.5-97.5)	8	87.5	(31.9-99.1)
Lactate dehydrogenase	5	60	(8.1-96.2)	5	100	(-)	4	50	(2.5-97.5)	8	50	(14.3-85.7)
All appropriate medications administered	5	80	(11.1-99.2)	5	100	(-)	4	100	(-)	8	87.5	(31.9-99.1)
Magnesium sulfate	5	80	(11.1-99.2)	5	100	(-)	4	100	(-)	8	87.5	(31.9-99.1)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	3	100	(-)	3	100	(-)	1	100	(-)	5	100	(-)
Eclampsia managed according to SMI standard (I4080)	5	0	(-)	5	0	(-)	4	0	(-)	8	12.5	(0.9-68.1)

As part of the Health Facility Observation, interviewers evaluated the capacity of basic level facilities to provide emergency obstetric services according to the monitoring indicator 7030. The indicator measures the continuous three-month availability of various medications required for emergency obstetric services. For a detailed definition of indicator 7030, see appendix B.

Table 4.29: Emergency care services (MI7030), intervention, ambulatory and basic facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Dexamethasone	5	100	(-)	11	100	(-)	19	100	(-)	18	100	(-)
Antibiotics	5	100	(-)	11	100	(-)	19	100	(-)	18	100	(-)
Gentamicin	5	80	(11.1-99.2)	11	100	(-)	19	100	(-)	18	94.4	(64.5-99.4)
Magnesium sulfate	5	80	(11.1-99.2)	11	100	(-)	19	94.7	(66.2-99.4)	18	100	(-)
Hydralazine	5	80	(11.1-99.2)	11	100	(-)	19	100	(-)	18	100	(-)
Ergobasin / ergonovine maleate / ergometrine / oxytocin	5	100	(-)	11	100	(-)	19	100	(-)	18	100	(-)
All drugs observed day of survey	5	60	(8.1-96.2)	11	100	(-)	19	94.7	(66.2-99.4)	18	94.4	(64.5-99.4)
All drugs continuously available in past three months	5	40	(3.8-91.9)	11	90.9	(46.3-99.1)	19	68.4	(42.7-86.3)	18	88.9	(61.1-97.6)
Emergency care according to standard (MI7030)	5	40	(3.8-91.9)	11	90.9	(46.3-99.1)	19	68.4	(42.7-86.3)	18	88.9	(61.1-97.6)

Drug three-month stock only captured for dexamethasone, gentamicin, magnesium sulfate, and oxytocin at baseline evaluations.

4.5 Neonatal care

Data were collected to evaluate both a health facility's capacity to offer neonatal care (staff, facilities, equipment, medication), as well as a review of the actual neonatal care supplied in postpartum care and neonatal complication medical records.

4.5.1 Routine newborn care with quality

Interviewers reviewed immediate postpartum records from uncomplicated deliveries in the past two years at basic and complete facilities to evaluate immediate routine newborn care. Neonates must receive all appropriate checks and procedures according to the standards defined by the quality routine newborn care performance indicator 4103. For a detailed definition of routine newborn care standards required for indicator 4103, see appendix B.

The I4103 indicator was first measured at the baseline in which 7.2% of observations met the indicator. In the third operation evaluation period the proportion of observations that met the indicator increased from the baseline with 40.3% of observations meeting the indicator.

Table 4.30: Routine newborn care with quality (I4103), intervention, basic and complete facilities

Description	Baseline			1st Operation			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vitamin K	69	95.7	(87-98.6)	184	98.9	(95.7-99.7)	279	92.5	(88.7-95.1)	122	85.2	(77.7-90.6)	176	88.6	(83-92.6)
Application of prophylaxis with oxytetracycline ophthalmic/chloramphenicol	69	91.3	(81.6-96.1)	184	98.9	(95.7-99.7)	279	92.1	(88.3-94.8)	122	86.1	(78.6-91.2)	176	88.6	(83-92.6)
Curing the umbilical cord with water and chlorhexidine	69	55.1	(43-66.6)	184	96.2	(92.2-98.2)	279	68.8	(63.1-74)	122	85.2	(77.7-90.6)	176	88.6	(83-92.6)
Evaluation for the presence of malformations	69	92.8	(83.4-97)	184	93.5	(88.8-96.3)	279	88.9	(84.6-92.1)	122	49.2	(40.3-58.1)	176	51.1	(43.7-58.5)
BCG vaccine	69	75.4	(63.6-84.3)	184	90.2	(84.9-93.8)	279	88.2	(83.8-91.5)	122	77.9	(69.5-84.4)	176	65.9	(58.5-72.6)
APGAR score (1 or 5 minutes)	69	100	(-)	184	100	(-)	279	94.3	(90.8-96.5)	122	98.4	(93.6-99.6)	176	98.3	(94.8-99.5)
Weight	69	95.7	(87-98.6)	184	98.9	(95.7-99.7)	279	92.1	(88.3-94.8)	122	96.7	(91.5-98.8)	176	97.7	(94-99.2)
Height	69	94.2	(85.2-97.9)	184	92.4	(87.5-95.5)	279	91.4	(87.5-94.2)	122	95.1	(89.4-97.8)	176	97.2	(93.3-98.8)
Head circumference	69	88.4	(78.2-94.2)	184	91.3	(86.2-94.6)	279	91	(87-93.9)	122	95.1	(89.4-97.8)	176	97.2	(93.3-98.8)
Respiratory rate	69	26.1	(16.9-38)	184	78.3	(71.7-83.7)	279	58.8	(52.9-64.4)	122	74.6	(66-81.6)	176	78.4	(71.6-83.9)
Routine newborn care with quality (I4103)	69	7.2	(3-16.6)	184	67.9	(60.8-74.3)	279	43.7	(38-49.6)	122	40.2	(31.7-49.2)	176	40.3	(33.3-47.8)

4.5.2 Neonatal complications

Interviewers evaluated records of neonatal complications (prematurity, sepsis, low birth weight, and asphyxia) that were systematically sampled by IHME from electronic discharge registries provided by the Secretary of Health. These records were used to evaluate quality of care, as defined by the neonatal complications performance indicator 4070 (see appendix B for detailed definitions of the care requirements for indicator 4070). Note that some records may have been evaluated for multiple neonatal complications.

The I4070 indicator was first measured at the baseline in which 40.5% of observations met the indicator. In the third operation evaluation period the proportion of observations that met the indicator increased from the baseline with 59.5% of observations meeting the indicator.

Table 4.31: Management of neonatal complications (I4070), intervention, basic and complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Sepsis managed to standard	115	40	(31.3-49.3)	199	56.8	(49.8-63.6)	82	61	(49.8-71.1)	76	59.2	(47.6-69.9)
Asphyxia managed to standard	35	48.6	(32-65.5)	40	30	(17.4-46.5)	18	61.1	(35.5-81.8)	60	68.3	(55.2-79.1)
Low birth weight managed to standard	39	33.3	(19.9-50.1)	45	17.8	(8.9-32.4)	41	61	(44.8-75.1)	64	59.4	(46.7-70.9)
Prematurity managed to standard	1	100	(-)	5	0	(-)	34	67.6	(49.5-81.7)	50	68	(53.5-79.7)
Management of neonatal complications (I4070)	190	40.5	(33.7-47.7)	283	46.3	(40.5-52.2)	133	60.2	(51.5-68.2)	185	59.5	(52.2-66.4)

Sepsis cases are evaluated as one component of the neonatal complications indicator 4070. Table 4.32 and Table 4.33 below display sepsis management practices in each operation measurement. For a detailed definition of the standards required for appropriate sepsis management, see appendix B.

Table 4.32: Management of neonatal complications (I4070), sepsis, intervention, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	71	73.2	(61.5-82.4)	173	69.9	(62.6-76.4)	69	78.3	(66.7-86.6)	50	96	(84.7-99)
Pulse / heart rate	71	94.4	(85.6-97.9)	173	98.3	(94.7-99.4)	69	100	(-)	50	100	(-)
Respiratory rate	71	94.4	(85.6-97.9)	173	96.5	(92.4-98.4)	69	100	(-)	50	100	(-)
Temperature	71	93	(83.9-97.1)	173	95.4	(91-97.7)	69	100	(-)	50	100	(-)
Abdominal examination	71	74.6	(63-83.6)	173	74	(66.9-80)	69	78.3	(66.7-86.6)	50	96	(84.7-99)
Antibiotics administered	71	93	(83.9-97.1)	173	91.3	(86.1-94.7)	69	100	(-)	50	98	(86.3-99.7)
Evaluated by doctor	71	85.9	(75.5-92.4)	173	90.2	(84.7-93.8)	69	95.7	(87-98.6)	50	96	(84.7-99)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Referred to complete facility (if hemodynamic failure or shock)	1	100	(-)	0			2	50	(0-100)	2	0	(-)
Sepsis managed to standard	71	64.8	(52.8-75.2)	173	65.3	(57.9-72.1)	69	72.5	(60.5-81.9)	50	86	(72.9-93.4)

Table 4.33: Management of neonatal complications (I4070), sepsis, intervention, complete facilities

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Description	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	44	61.4	(45.8-74.9)	26	50	(30.5-69.5)	13	84.6	(49-96.9)	26	88.5	(67.9-96.5)
Pulse / heart rate	44	100	(-)	26	100	(-)	13	92.3	(53.1-99.2)	26	96.2	(74.6-99.5)
Respiratory rate	44	100	(-)	26	100	(-)	13	92.3	(53.1-99.2)	26	92.3	(71.9-98.3)
Temperature	44	97.7	(84.5-99.7)	26	100	(-)	13	100	(-)	26	96.2	(74.6-99.5)
Abdominal examination	44	63.6	(48-76.8)	26	50	(30.5-69.5)	13	92.3	(53.1-99.2)	26	92.3	(71.9-98.3)
Lab tests	44	0	(-)	26	0	(-)	13	0	(-)	26	7.7	(1.7-28.1)
Oxygen saturation	44	43.2	(29-58.6)	26	0	(-)	13	30.8	(10.2-63.5)	26	46.2	(27.3-66.2)
C-reactive protein	44	75	(59.6-85.9)	26	65.4	(44.3-81.8)	13	61.5	(30.5-85.4)	26	30.8	(15.4-52)
Platelets	44	93.2	(80.1-97.9)	26	96.2	(74.6-99.5)	13	100	(-)	26	92.3	(71.9-98.3)
Leukocytes	44	93.2	(80.1-97.9)	26	100	(-)	13	100	(-)	26	96.2	(74.6-99.5)
Hemoglobin	44	56.8	(41.4-71)	26	69.2	(48-84.6)	13	46.2	(19.5-75.2)	26	50	(30.5-69.5)
Hematocrit	44	93.2	(80.1-97.9)	26	96.2	(74.6-99.5)	13	100	(-)	26	84.6	(63.7-94.5)
Blood culture	44	6.8	(2.1-19.9)	26	0	(-)	13	0	(-)	26	11.5	(3.5-32.1)
Neutrophil band ratio / absolute ratio	44	25	(14.1-40.4)	26	3.8	(0.5-25.4)	13	53.8	(24.8-80.5)	26	84.6	(63.7-94.5)
Antibiotics administered	44	88.6	(74.7-95.4)	26	92.3	(71.9-98.3)	13	100	(-)	26	100	(-)
Evaluated by specialist	44	88.6	(74.7-95.4)	26	76.9	(55.6-89.9)	13	100	(-)	26	88.5	(67.9-96.5)
Sepsis managed to standard	44	0	(-)	26	0	(-)	13	0	(-)	26	7.7	(1.7-28.1)

Asphyxia cases are evaluated as one component of the neonatal complications indicator 4070. Table 4.34 and Table 4.35 below display asphyxia management practices in each operation measurement. For a detailed definition of the standards required for appropriate asphyxia management, see appendix B.

Table 4.34: Management of neonatal complications (I4070), asphyxia, intervention, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	11	63.6	(28.8-88.3)	30	93.3	(75.3-98.5)	8	100	(-)	49	100	(-)
Pulse / heart rate	11	81.8	(42-96.5)	30	96.7	(77.8-99.6)	8	100	(-)	49	100	(-)
Respiratory rate	11	63.6	(28.8-88.3)	30	93.3	(75.3-98.5)	8	100	(-)	49	100	(-)
APGAR score at one minute	11	72.7	(35.4-92.8)	30	96.7	(77.8-99.6)	8	100	(-)	49	100	(-)
APGAR score at five minutes	11	72.7	(35.4-92.8)	30	96.7	(77.8-99.6)	8	100	(-)	49	100	(-)
Glycemia	11	27.3	(7.2-64.6)	30	40	(23.5-59.1)	8	87.5	(31.9-99.1)	49	73.5	(58.9-84.2)
Oxygen saturation lab test (if APGAR <= 3 at five minutes)	1	0	(-)	1	0	(-)	0			1	0	(-)
Heat application	11	36.4	(11.7-71.2)	30	60	(40.9-76.5)	8	100	(-)	49	98	(86-99.7)
Oxygen application (if APGAR <= 3 at five minutes)	1	0	(-)	1	0	(-)	0			1	100	(-)
AMBU / positive pressure ventilation / endotracheal intubation / chest compressions (if APGAR <= 3 at five minutes)	1	100	(-)	1	100	(-)	0			1	100	(-)
Evaluated by doctor	11	72.7	(35.4-92.8)	30	86.7	(68-95.2)	8	100	(-)	49	91.8	(79.6-97)
Referred to complete facility (if APGAR <= 3 at five minutes)	1	100	(-)	1	100	(-)	0			1	100	(-)
Asphyxia managed to standard	11	18.2	(3.5-58)	30	20	(8.8-39.2)	8	87.5	(31.9-99.1)	49	65.3	(50.6-77.6)

Table 4.35: Management of neonatal complications (I4070), asphyxia, intervention, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	24	95.8	(72.6-99.5)	10	100	(-)	10	90	(42.2-99.1)	11	100	(-)
Pulse / heart rate	24	100	(-)	10	100	(-)	10	100	(-)	11	100	(-)
Respiratory rate	24	100	(-)	10	100	(-)	10	90	(42.2-99.1)	11	100	(-)
APGAR score at one minute	24	95.8	(72.6-99.5)	10	100	(-)	10	100	(-)	11	100	(-)
APGAR score at five minutes	24	95.8	(72.6-99.5)	10	100	(-)	10	100	(-)	11	100	(-)
Glycemia	24	87.5	(65.5-96.3)	10	60	(24.3-87.5)	10	50	(18.1-81.9)	11	81.8	(42-96.5)
Oxygen saturation lab test (if APGAR <= 3 at five minutes)	0			0			0			0		
Heat application	24	70.8	(48.5-86.3)	10	80	(37.8-96.3)	10	100	(-)	11	100	(-)
Oxygen application (if APGAR <= 3 at five minutes)	0			0			0			0		

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
AMBU / positive pressure ventilation / endotracheal intubation / chest compressions (if APGAR <= 3 at five minutes)	0			0			0			0		
Evaluated by doctor	24	100	(-)	10	100	(-)	10	100	(-)	11	100	(-)
Asphyxia managed to standard	24	62.5	(40.6-80.2)	10	60	(24.3-87.5)	10	40	(12.5-75.7)	11	81.8	(42-96.5)

Low birth weight cases are evaluated as one component of the neonatal complications indicator 4070. Table 4.36 and Table 4.37 below display low birth weight management practices in each operation measurement. For a detailed definition of the standards required for appropriate low birth weight management, see appendix B.

Table 4.36: Management of neonatal complications (I4070), low birth weight, intervention, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	23	65.2	(42.6-82.6)	25	60	(38.8-78)	20	95	(67.7-99.4)	40	80	(64-90)
Weight	23	95.7	(71.6-99.5)	25	96	(73.7-99.5)	20	100	(-)	40	97.5	(83-99.7)
Pulse / heart rate	23	95.7	(71.6-99.5)	25	96	(73.7-99.5)	20	100	(-)	40	100	(-)
Respiratory rate	23	95.7	(71.6-99.5)	25	96	(73.7-99.5)	20	100	(-)	40	100	(-)
Head circumference	23	78.3	(55.2-91.3)	25	88	(66.7-96.4)	20	95	(67.7-99.4)	40	95	(81.1-98.8)
Silverman-Anderson / Downes test	23	65.2	(42.6-82.6)	25	64	(42.5-81)	20	100	(-)	40	85	(69.6-93.3)
APGAR score / skin test	23	91.3	(68.6-98.1)	25	100	(-)	20	100	(-)	40	97.5	(83-99.7)
Glycemia	23	30.4	(14.3-53.4)	25	28	(13.2-49.8)	20	90	(64.5-97.8)	40	70	(53.5-82.6)
Gestational age calculated using Capurro/Ballard (if in-facility)	23	87	(64.2-96.1)	25	80	(58.3-92)	19	89.5	(62.9-97.7)	36	86.1	(69.7-94.4)
Weight classification (if in-facility)	23	100	(-)	25	100	(-)	19	100	(-)	36	97.2	(81.3-99.6)
Heat application	23	87	(64.2-96.1)	25	44	(25.2-64.7)	20	100	(-)	40	90	(75.4-96.4)
Breastfed / given glucose	23	95.7	(71.6-99.5)	25	96	(73.7-99.5)	20	100	(-)	40	90	(75.4-96.4)
Evaluated by doctor	23	87	(64.2-96.1)	25	72	(50.2-86.8)	20	90	(64.5-97.8)	40	92.5	(78.3-97.7)
Referred to a complete facility (if weight < 1500 g)	0			4	50	(2.5-97.5)	3	0	(-)	3	0	(-)
Appropriate management of any associated complications	0			2	100	(-)	2	100	(-)	8	87.5	(31.9-99.1)
Pneumonia: antibiotics or referral	0			2	100	(-)	0			2	100	(-)
Diarrhea: liquids/ORS or referral	0			0			0			0		
Seizures: anticonvulsants or referral	0			0			0			1	100	(-)
Hypoglycemia: glucose IV or referral	0			0			2	100	(-)	5	80	(11.1-99.2)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Low birth weight managed to standard	23	21.7	(8.7-44.8)	25	12	(3.6-33.3)	20	65	(40.4-83.6)	40	42.5	(27.7-58.7)

Table 4.37: Management of neonatal complications (I4070), low birth weight, intervention, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	16	87.5	(57-97.4)	20	40	(20-64)	21	71.4	(47.1-87.5)	24	100	(-)
Weight	16	93.7	(60.7-99.3)	20	100	(-)	21	100	(-)	24	100	(-)
Pulse / heart rate	16	100	(-)	20	100	(-)	21	100	(-)	24	100	(-)
Respiratory rate	16	100	(-)	20	100	(-)	21	95.2	(69.1-99.4)	24	100	(-)
Head circumference	16	93.7	(60.7-99.3)	20	100	(-)	21	95.2	(69.1-99.4)	24	100	(-)
Silverman-Anderson / Downes test	16	93.7	(60.7-99.3)	20	40	(20-64)	21	81	(56.4-93.3)	24	100	(-)
APGAR score / skin test	16	100	(-)	20	100	(-)	21	100	(-)	24	100	(-)
Glycemia	16	68.7	(40.2-87.8)	20	65	(40.4-83.6)	21	85.7	(61.3-95.8)	24	87.5	(65.5-96.3)
Gestational age calculated using Capurro/Ballard (if in-facility)	16	100	(-)	18	100	(-)	14	100	(-)	20	100	(-)
Weight classification (if in-facility)	16	100	(-)	18	100	(-)	14	100	(-)	20	100	(-)
Heat application	16	87.5	(57-97.4)	20	80	(54.6-93)	21	100	(-)	24	100	(-)
Breastfed / given glucose	16	93.7	(60.7-99.3)	20	95	(67.7-99.4)	21	95.2	(69.1-99.4)	24	100	(-)
Evaluated by doctor	16	93.7	(60.7-99.3)	20	100	(-)	21	100	(-)	24	100	(-)
Appropriate management of any associated complications	0			0			4	100	(-)	7	100	(-)
Pneumonia: antibiotics	0			0			1	100	(-)	6	100	(-)
Diarrhea: liquids/ORS	0			0			0			0		
Seizures: anticonvulsants	0			0			0			0		
Hypoglycemia: glucose IV	0			0			4	100	(-)	1	100	(-)
Low birth weight managed to standard	16	50	(25-75)	20	25	(9.9-50.3)	21	57.1	(34.2-77.4)	24	87.5	(65.5-96.3)

Prematurity cases are evaluated as one component of the neonatal complications indicator 4070. Table 4.38 and Table 4.39 below display prematurity management practices in each operation measurement. For a detailed definition of the standards required for appropriate prematurity management, see appendix B.

Table 4.38: Management of neonatal complications (I4070), prematurity, intervention, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	1	100	(-)	5	60	(8.1-96.2)	17	88.2	(59.1-97.5)	28	78.6	(58.3-90.6)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Weight	1	100	(-)	5	100	(-)	17	94.1	(62.7-99.3)	28	100	(-)
Pulse / heart rate	1	100	(-)	5	100	(-)	17	94.1	(62.7-99.3)	28	100	(-)
Respiratory rate	1	100	(-)	5	100	(-)	17	94.1	(62.7-99.3)	28	100	(-)
Head circumference	1	100	(-)	5	100	(-)	17	88.2	(59.1-97.5)	28	96.4	(76.3-99.6)
Silverman-Anderson / Downes test	1	100	(-)	5	60	(8.1-96.2)	17	94.1	(62.7-99.3)	28	82.1	(62.1-92.8)
APGAR score / skin test	1	100	(-)	5	100	(-)	17	94.1	(62.7-99.3)	28	100	(-)
Glycemia	1	100	(-)	5	20	(0.8-88.9)	17	88.2	(59.1-97.5)	28	71.4	(51.1-85.7)
Gestational age calculated using Capurro/Ballard (if in-facility)	1	100	(-)	5	100	(-)	16	93.7	(60.7-99.3)	24	95.8	(72.6-99.5)
Weight classification (if in-facility)	1	100	(-)	5	100	(-)	16	100	(-)	24	100	(-)
Heat application	1	100	(-)	5	40	(3.8-91.9)	17	94.1	(62.7-99.3)	28	96.4	(76.3-99.6)
Breastfed / given glucose	1	100	(-)	5	80	(11.1-99.2)	17	100	(-)	28	100	(-)
Evaluated by doctor	1	100	(-)	5	80	(11.1-99.2)	17	88.2	(59.1-97.5)	28	96.4	(76.3-99.6)
Referred to a complete facility (if weight < 1500 g)	0			2	100	(-)	3	0	(-)	3	0	(-)
Appropriate management of any associated complications	0			0			4	100	(-)	4	100	(-)
Pneumonia: antibiotics or referral	0			0			0			2	100	(-)
Diarrhea: liquids/ORS or referral	0			0			0			0		
Seizures: anticonvulsants or referral	0			0			0			0		
Hypoglycemia: glucose IV or referral	0			0			4	100	(-)	2	100	(-)
Prematurity managed to standard	1	100	(-)	5	0	(-)	17	64.7	(37.7-84.8)	28	57.1	(37.5-74.8)

Table 4.39: Management of neonatal complications (I4070), prematurity, intervention, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	0			0			17	82.4	(53.7-94.9)	22	90.9	(67.3-98)
Weight	0			0			17	100	(-)	22	100	(-)
Pulse / heart rate	0			0			17	94.1	(62.7-99.3)	22	100	(-)
Respiratory rate	0			0			17	94.1	(62.7-99.3)	22	100	(-)
Head circumference	0			0			17	100	(-)	22	100	(-)
Silverman-Anderson / Downes test	0			0			17	94.1	(62.7-99.3)	22	90.9	(67.3-98)
APGAR score / skin test	0			0			17	100	(-)	22	100	(-)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Glycemia	0			0			17	88.2	(59.1-97.5)	22	90.9	(67.3-98)
Gestational age calculated using Capurro/Ballard (if in-facility)	0			0			10	100	(-)	19	100	(-)
Weight classification (if in-facility)	0			0			10	100	(-)	19	94.7	(66.2-99.4)
Heat application	0			0			17	100	(-)	22	100	(-)
Breastfed / given glucose	0			0			17	88.2	(59.1-97.5)	22	100	(-)
Evaluated by doctor	0			0			17	100	(-)	22	100	(-)
Appropriate management of any associated complications	0			0			4	100	(-)	6	100	(-)
Pneumonia: antibiotics	0			0			1	100	(-)	5	100	(-)
Diarrhea: liquids/ORS	0			0			0			0		
Seizures: anticonvulsants	0			0			0			0		
Hypoglycemia: glucose IV	0			0			3	100	(-)	1	100	(-)
Prematurity managed to standard	0			0			17	70.6	(42.9-88.5)	22	81.8	(58.1-93.6)

No applicable records reviewed in the baseline and second operation measurement.

4.6 Data for decision-making

As part of a new performance indicator (7500) implemented to measure interventions conducted during the SMI third operation, hospitals in Nicaragua were evaluated on their capacity to use data for decision-making related to management of obstetric or neonatal complications. Specifically, administrative records and staff meeting notes for the past six months were reviewed for the identification of gaps related to complications management such as lack of supplies, training of personnel, information system registration, or other management aspects. For one randomly selected month, the indicator requires that evidence of follow-up action taken in relation to the identified gaps be observed. For a detailed definition of the standards required for indicator 7500, see appendix B.

Table 4.40: Use of data for decision-making (I7500), intervention, hospitals

Description	3rd Operation		
	N	%	CI
Plans observed for at least 4 of past 6 months	15	100	(-)
Follow-up action taken for one randomly selected month	15	93.3	(58.4-99.3)
Use of data for decision-making (I7500)	15	93.3	(58.4-99.3)

Chapter 5: Challenges and conclusions

5.1 Challenges and limitations

5.1.1 Household data collection

In Nicaragua, high rates of household vacancy attributable to widespread migration were encountered during the household census. Vacancy rates exceeded 10% in 24 out of 67 segments. Additionally, rains from Hurricane Julia made it difficult to access certain communities. In Nicaragua in the third operation measurement, the same community was found to have been selected twice in the sample, so a replacement segment was provided in the same municipality.

5.1.2 Health facility data collection

Inclement weather and flooding also contributed to challenges in accessing health facilities, resulting in scheduling delays. Two ambulatory facilities that were originally selected were found not to exist upon visiting the communities. These facilities were replaced with the ambulatory facilities in each community where residents reported actually receiving care.

Beyond accessibility, challenges emerged in meeting quotas for medical record review. Water damage due to flooding was encountered in multiple medical record storage environments, in addition to general impediments to locating sampled medical records due to deficits in archiving practices.

5.2 COVID-19 pandemic considerations

The results of the third operation SMI measurement cannot be fully understood outside of the context of the COVID-19 pandemic, which requires consideration of both its burden on health systems and also its impact on the capacity to conduct rigorous data collection programs. This measurement, intended to evaluate interventions conducted between 2018-2020, was delayed two years due to travel advisories, facility closures, and public health recommendations. This resulted in a significant lag between the effective intervention period and the evaluation period and introduced the potential for recall bias to influence interview responses. Additionally, ongoing treatment of COVID-19 cases at health facilities and altered behaviors due to the pandemic posed health risks to data collectors and created logistical hurdles for meeting data collection quotas.

SMI interventions have likely contributed to a resilient infrastructure that facilitated the response to the COVID-19 pandemic, but the impacts to the health system are far-reaching. Demand for health services was lowered by delayed or diminished care-seeking. Global shortages impacted local availability of medical and pharmaceutical supplies. Management of the pandemic required a diversion of limited resources, which may have had adverse effects on routine care and diagnosis of new conditions. Longer-term, macroeconomic repercussions of the pandemic have also likely impacted access to healthcare and institutional capacity throughout the Mesoamerica region.

5.3 Key findings

5.3.1 Performance indicator results

In total, 10 performance indicators were measured by IHME after the third operation interventions. Five indicators were measured through medical record review at health facilities, one indicator was measured via the health facility observation, and four indicators were measured through household surveys.

Many indicators showed notable improvement since baseline, suggesting meaningful adoption of intervention practices even amid a difficult pandemic health landscape. Progress in household indicators for anemia prevalence, complete vaccination for age, and adequate diarrhea treatment may have been hampered by deferred care-seeking during the COVID-19 pandemic. Performance on pregnancy and delivery related indicators was mixed; timely first antenatal care visits as measured by medical record review, as well as quality postpartum care as measured by household surveys, increased substantially over the baseline. Improvements in obstetric complications management were less evident; in many cases, lab tests required by the indicator definition were not documented in the medical record. Neonatal complications management improved notably, and while performance on routine newborn care was hampered by a lack of registered examinations for malformations, the overall progress since baseline was nonetheless pronounced.

Two novel performance were introduced at the third operation, the first designed to measure the outcomes of interventions related to cervical cancer screening via medical record review and the second related to decision making practices using data at health facilities. Both displayed positive results in their first measurement, suggesting that despite limited time for implementation, a robust system for the adoption of interventions was established in Nicaragua.

Comparison area indicator results reflect the strategy of employing lessons learned from SMI interventions across the Nicaragua health system, even beyond intervention areas. For household indicators, improvements in intervention areas were often closely matched by improvements in comparison areas. Comparison area indicator results at baseline were typically higher than in intervention areas.

For health facility indicators related to management of obstetric and neonatal complications, comparison area results remained stagnant from the baseline, while intervention areas showed marked improvement. The routine newborn care indicator showed greater improvement in intervention areas than comparison areas, despite similar baseline values. The novel cervical cancer screening indicator performed better in intervention areas than comparison areas.

For a summary of the results of each performance indicator across measurement rounds, see appendix A.

5.3.2 Monitoring indicator results

In addition to the 10 performance indicators, 29 monitoring indicators defined by IDB and the Nicaragua Ministry of Health were measured, 19 through household surveys and 10 through health facility observations and medical record review.

Household survey monitoring indicators track a range of topics related to childbirth, contraceptive use, skilled health care attendance, access to and quality of care at health facilities, as well as vaccination, feeding habits, and treatment of illnesses in young children. Broadly, the results of the household monitoring indicators did not show marked improvement over the baseline, suggesting that SMI outcomes in Nicaragua were focused more narrowly on interventions measured by performance indicators.

Monitoring indicators measured from medical record review evaluated quality antenatal care and delivery care outcomes related to partograph revision, active management of the third stage of labor, and immediate postpartum care. Though only postpartum care showed notable improvement over time, all four of the MRR monitoring indicators sustained better performance in intervention areas than comparison areas. In particular, partograph revision performance decreased in comparison areas from second to third operation measurements.

The remaining six monitoring indicators were measured from the health facility observation, and evaluated the capacity of facilities to conduct vaccination, child health care, pre- and postnatal care, emergency care, contraceptive administration, and socioculturally adaptive delivery services. These indicators required physical observation of supplies and continuous stocks of vaccines, contraceptive methods, and medications. Unlike other monitoring indicators, these facility-level indicators demonstrated marked improvement over baseline in intervention areas, especially relative to comparison areas where performance either improved less dramatically or stagnated.

The impacts of the COVID-19 pandemic likely contribute to the lack of notable improvement in performance for some monitoring indicators, particularly those related to care seeking.

5.4 Conclusions

Several SMI indicators saw meaningful increases since the baseline. The third operation included ambitious new indicators with impressive progress despite the COVID-19 pandemic. Though some indicator targets were not met, it is important to keep in mind that the indicator requirements are stringent and all subcomponents must be met in order to reach the target. Even for indicators where the target was not met for the third operation, there were notable improvements in key subcomponents. For indicators measured through the medical record review, less pronounced improvement may be driven by poor record-keeping rather than by failures in care provision - medical record storage and data management has been identified as an area for continued focus, recognizing the distinct value of both care and documentation.

Appendix A: Indicator matrices

A.1 Performance indicator matrices

Table A.1: Household performance indicators

Indicator	Description	Time Period	N	%	CI
I1060	Children (6-23mo) with hemoglobin <110g/L	Baseline	435	53.9	(48 - 59.7)
		2nd Operation	487	51.3	(44.8 - 57.7)
		3rd Operation	350	51.4	(42.3 - 60.5)
I4030	Skilled postpartum care (10 days)	Baseline	657	60.1	(54.3 - 65.7)
		2nd Operation	874	82.6	(77.6 - 86.7)
		3rd Operation	572	86.8	(81.7 - 90.6)
I5020	Complete vaccination for age	Baseline	1398	48	(41.8 - 54.3)
		2nd Operation	1802	46.7	(42.1 - 51.3)
		3rd Operation	1331	52.5	(45 - 59.9)
I5060	Diarrhea treatment with ORS and zinc (0-59mo)	Baseline	197	1.4	(0.5 - 4.3)
		2nd Operation	246	6.5	(3.9 - 10.7)
		3rd Operation	184	10.7	(7.2 - 15.6)

Table A.2: Health facility MRR-based performance indicators

Indicator	Description	Time Period	N	%	CI
I3040	First ANC within 12 weeks	Baseline	106	39.6	(30.6 - 49.4)
		1st Operation	371	29.9	(25.5 - 34.8)
		2nd Operation	389	51.7	(46.7 - 56.6)
		3rd Op. Pre-evaluation	151	63.6	(55.5 - 70.9)
		3rd Op. Evaluation	262	63.4	(57.3 - 69)
I4103	Routine newborn care with quality	Baseline	69	7.2	(3 - 16.6)
		1st Operation	184	67.9	(60.8 - 74.3)
		2nd Operation	279	43.7	(38 - 49.6)
		3rd Op. Pre-evaluation	122	40.2	(31.7 - 49.2)
		3rd Op. Evaluation	176	40.3	(33.3 - 47.8)
I4070	Management of neonatal complications	Baseline	190	40.5	(33.7 - 47.7)
		1st Operation	Not measured at 1st operation		
		2nd Operation	283	46.3	(40.5 - 52.2)
		3rd Op. Pre-evaluation	133	60.2	(51.5 - 68.2)
		3rd Op. Evaluation	185	59.5	(52.2 - 66.4)
I4080	Management of obstetric complications	Baseline	204	36.8	(30.4 - 43.7)
		1st Operation	Not measured at 1st operation		
		2nd Operation	301	44.9	(39.3 - 50.5)
		3rd Op. Pre-evaluation	131	44.3	(35.9 - 53)
		3rd Op. Evaluation	218	44.5	(38 - 51.2)
I6005	Cervical cancer screening with quality	Baseline	Not measured at baseline		
		1st Operation	Not measured at 1st operation		

Indicator	Description	Time Period	N	%	CI
		2nd Operation	Not measured at 2nd operation		
		3rd Op. Pre-evaluation	Not measured at 3rd operation pre-evaluation		
		3rd Op. Evaluation	208	76.9	(70.7 - 82.2)

Table A.3: Health facility observation-based performance indicators

Indicator	Description	Time Period	N	%	CI
		Baseline	Not measured at baseline		
		1st Operation	Not measured at 1st operation		
		2nd Operation	Not measured at 2nd operation		
		3rd Operation	15	93.3	(58.4 - 99.3)

A.2 Monitoring indicator matrices

Table A.4: Household monitoring indicators

Indicator	Description	Time Period	N	%	CI
MI1050	Children (0-59mo) with hemoglobin <110g/L	Baseline	1218	38.8	(35 - 42.8)
		2nd Operation	1518	44.4	(39.9 - 49.1)
		3rd Operation	1179	38.5	(33.2 - 44.2)
MI1070	Children (0-59mo) with height <-2SD of mean of reference population	Baseline	1366	13.3	(10.8 - 16.3)
		2nd Operation	1719	15.6	(13.1 - 18.4)
		3rd Operation	1295	10.7	(8.6 - 13.2)
MI1080	Women (15-49 years) with a live birth in the last year	Baseline	1713	11.9	(10.5 - 13.6)
		2nd Operation	2319	8.8	(7.8 - 9.9)
		3rd Operation	1702	9.5	(8.1 - 11)
MI1090	Women (15-19 years) with a live birth in the last year	Baseline	364	13.9	(10.4 - 18.5)
		2nd Operation	448	9.8	(7.8 - 12.3)
		3rd Operation	275	14.1	(10 - 19.4)
MI2010	Women using modern contraception	Baseline	958	83.1	(79.4 - 86.3)
		2nd Operation	1369	79.3	(75 - 82.9)
		3rd Operation	982	85.2	(81.8 - 88)
MI2020	Women in need of but not using contraception	Baseline	958	16.9	(13.7 - 20.6)
		2nd Operation	1369	20.7	(17.1 - 25)
		3rd Operation	982	14.8	(12 - 18.2)
MI2040	Women who received contraception counseling	Baseline	1112	39.2	(34.2 - 44.5)
		2nd Operation	1594	34.2	(29.5 - 39.1)
		3rd Operation	912	40	(35.4 - 44.7)
MI2030	Interruption in contraception use	Baseline	846	4	(2.5 - 6.4)
		2nd Operation	1151	2.7	(1.9 - 4)
		3rd Operation	762	6.9	(4.8 - 9.7)
MI3010	Skilled antenatal care (1 visit)	Baseline	657	97.1	(95 - 98.3)
		2nd Operation	877	89.1	(84.6 - 92.5)
		3rd Operation	573	90.9	(87.8 - 93.3)

Indicator	Description	Time Period	N	%	CI
MI3020	Skilled antenatal care (4 visits)	Baseline	657	83.1	(79.9 - 85.9)
		2nd Operation	858	75.2	(69.4 - 80.2)
		3rd Operation	561	72	(67.8 - 75.9)
MI4010	Skilled in-facility delivery	Baseline	657	87.7	(82.3 - 91.6)
		2nd Operation	876	86.6	(81.9 - 90.3)
		3rd Operation	569	87.5	(79.7 - 92.6)
MI4030	Skilled postpartum care (7 days)	Baseline	657	58.1	(52.2 - 63.7)
		2nd Operation	868	33.6	(28.7 - 38.9)
		3rd Operation	567	46.1	(41.1 - 51.2)
MI4101	Skilled neonatal care (10 days)	Baseline	635	79.6	(73.3 - 84.7)
		2nd Operation	811	65.9	(59.5 - 71.7)
		3rd Operation	506	77.4	(72.3 - 81.9)
MI4110	Recognition of 5 danger signs in newborns	Baseline	551	33.9	(29.6 - 38.6)
		2nd Operation	641	23.3	(17.9 - 29.9)
		3rd Operation	423	13.9	(9.7 - 19.5)
MI4120	Use of maternal waiting home	Baseline	657	11.4	(8.3 - 15.5)
		2nd Operation	876	26.1	(19.6 - 33.7)
		3rd Operation	574	33.5	(25.3 - 42.9)
MI5025	Children (12-23mo) who received MMR vaccine	Baseline	296	70.9	(62.9 - 77.9)
		2nd Operation	360	73.8	(67.8 - 79.1)
		3rd Operation	241	59.4	(52 - 66.3)
MI5030	Children (18-59mo) who received 2 doses of deworming	Baseline	966	34.1	(31.2 - 37.1)
		2nd Operation	1254	33.8	(30 - 37.9)
		3rd Operation	942	40	(34.4 - 45.8)
MI5040	Exclusive breastfeeding (0-5mo)	Baseline	134	59.5	(47.9 - 70.1)
		2nd Operation	165	40.2	(32.6 - 48.4)
		3rd Operation	122	26.7	(19 - 36)
MI5050	Early initiation of breastfeeding	Baseline	681	82.2	(78.3 - 85.6)
		2nd Operation	892	78.3	(73.2 - 82.6)
		3rd Operation	579	70.7	(65 - 75.9)

Table A.5: Health facility MRR-based monitoring indicators

Indicator	Description	Time Period	N	%	CI
MI3030	At least four antenatal care (ANC) visits to standard	Baseline	135	38.5	(30.6 - 47.1)
		1st Operation	482	20.1	(16.8 - 24)
		2nd Operation	490	11.2	(8.7 - 14.3)
		3rd Op. Pre-evaluation	178	16.3	(11.5 - 22.5)
		3rd Op. Evaluation	301	16.9	(13.1 - 21.6)
MI4050	Maternal postpartum care within two hours after birth	Baseline	Not measured at baseline		
		1st Operation	166	45.2	(37.7 - 52.9)
		2nd Operation	267	73.8	(68.1 - 78.7)
		3rd Op. Pre-evaluation	81	69.1	(58 - 78.4)

Indicator	Description	Time Period	N	%	CI
		3rd Op. Evaluation	119	65.5	(56.5 - 73.6)
MI4065	Partograph completion for uncomplicated deliveries	Baseline	Not measured at baseline		
		1st Operation	220	92.7	(88.4 - 95.5)
		2nd Operation	316	90.8	(87.1 - 93.6)
		3rd Op. Pre-evaluation	116	81	(72.7 - 87.3)
		3rd Op. Evaluation	173	89	(83.4 - 92.9)
MI4095	Active management of the third stage of labor	Baseline	90	83.3	(74 - 89.8)
		1st Operation	210	64.8	(58 - 71)
		2nd Operation	316	86.4	(82.1 - 89.8)
		3rd Op. Pre-evaluation	116	89.7	(82.5 - 94.1)
		3rd Op. Evaluation	172	87.2	(81.3 - 91.5)

Table A.6: Health facility observation-based monitoring indicators

Indicator	Description	Time Period	N	%	CI
MI7000	Cold chain	Baseline	28	28.6	(14.3 - 48.9)
		1st Operation	27	88.9	(68.9 - 96.7)
		2nd Operation	41	78	(62.2 - 88.5)
		3rd Operation	34	97.1	(80.2 - 99.6)
MI7010	Child care services	Baseline	37	10.8	(3.9 - 26.5)
		1st Operation	53	73.6	(59.7 - 84)
		2nd Operation	56	57.1	(43.6 - 69.7)
		3rd Operation	37	67.6	(50.3 - 81.1)
MI7020	Pre/postnatal care services	Baseline	37	27	(14.7 - 44.2)
		1st Operation	56	76.8	(63.6 - 86.3)
		2nd Operation	57	68.4	(54.9 - 79.4)
		3rd Operation	38	73.7	(56.8 - 85.6)
MI7030	Emergency care services	Baseline	5	40	(3.8 - 91.9)
		1st Operation	11	90.9	(46.3 - 99.1)
		2nd Operation	19	68.4	(42.7 - 86.3)
		3rd Operation	18	88.9	(61.1 - 97.6)
MI7050	Contraceptive services	Baseline	37	59.5	(42.4 - 74.5)
		1st Operation	56	87.5	(75.6 - 94.1)
		2nd Operation	54	74.1	(60.4 - 84.3)
		3rd Operation	38	94.7	(80.2 - 98.8)
MI8870	Sociocultural conditions	Baseline	3	100	(-)
		1st Operation	7	71.4	(21.5 - 95.8)
		2nd Operation	8	87.5	(31.9 - 99.1)
		3rd Operation	7	100	(-)

Appendix B: Indicator Definitions

B.1 Household performance indicators

1060: Children 6-23mo with hemoglobin <110g/L

Source: Household survey

Denominator: Total number of children aged 6-23 months in household surveys with a capillary blood sample used to measure hemoglobin

Formula: Hemoglobin level is above the following minimums based on community altitude:

- 110g/L if altitude is <1000
- 112g/L if altitude is $\geq 1000\text{m}$ & <1250m
- 115g/L if altitude is $\geq 1250\text{m}$ & <1750m
- 118g/L if altitude is $\geq 1750\text{m}$ & <2250m
- 123g/L if altitude is $\geq 2250\text{m}$ & <2750m
- 129g/L if altitude is $\geq 2750\text{m}$ & <3250m
- 137g/L if altitude is $\geq 3250\text{m}$ & <3750m
- 145g/L if altitude is $\geq 3750\text{m}$ & <4250m
- 155g/L if altitude is $\geq 4250\text{m}$ & <4750m
- 165g/L if altitude is $\geq 4750\text{m}$ & <5250m
- 177g/L if altitude is $\geq 5250\text{m}$

4030: Women aged 15-49 who received postpartum care by skilled personnel within 10 days after their most recent birth in the last 2 years

Source: Household survey

Denominator: Total number of women 15-49 years of age with a live birth in the last two years

Formula: Woman reports having received postpartum care by skilled personnel (doctor, nurse, or auxiliary nurse) within 10 days of her most recent birth in the last 2 years, OR woman reports receiving a medical check before discharge if she delivered in a health facility

5020: Complete vaccination for age

Source: Household survey

Denominator: Total number of children aged 0-59 months in household surveys

Formula: Child received the following vaccinations according to their vaccine card, depending on the child's age at the time of the survey:

- BCG

- Birth dose (if weight > 2000g at 3rd operation)
- Polio
 - 2 months
 - 4 months
 - 6 months
- Pentavalent
 - 2 months
 - 4 months
 - 6 months
- Pneumococcal conjugate (children born 2012 or later)
 - 2 months
 - 4 months
 - 6 months
- Rotavirus
 - 2 months
 - 4 months
 - 6 months (children born before September 2014)
- DPT
 - 18 months
- MMR
 - 12 months
 - 18 months (3rd operation)

5025: Children (12-23 months) with MMR vaccine

Source: Household survey

Denominator: Total number of children aged 12-23 months in household surveys

Formula: Child received the MMR vaccine according to their vaccine card

5060: Diarrhea treatment with ORS and zinc at home

Source: Household survey

Denominator: Total number of children aged 0-59 months with reported diarrhea in the past two weeks in household surveys

Formula: Caregiver reports giving the child the following: (a fluid made from oral rehydration salts / a pre-packaged ORS liquid (bottled oral serum) / homemade liquid recommended by health authorities) + (zinc pills / zinc syrup)

B.2 Health facility performance indicators

3040: Women of reproductive age who attended their first antenatal care (ANC) visit before 12 weeks gestation in the last two years

Source: Medical record review

Denominator: Total number of antenatal care records at ambulatory facilities in the sample

Formula: *Ambulatory:* Observe the following in the record: woman had the first ANC at ≤ 12 weeks gestation

4070: Neonatal complications (low birth weight, prematurity, asphyxia, and sepsis) managed according to the norm in the last two years

Source: Medical record review

Denominator: Total number of records of neonates with birth complications (prematurity, low birth weight, birth asphyxia, or sepsis) at basic & complete facilities in the sample

Formula:

Prematurity (excluding neonates with gestational age ≥ 37 weeks)

Basic:

Observe the following in the record: gestational age calculation using Capurro or Ballard (if neonate was not referred from another facility) + classification of neonate by gestational age recorded (if neonate was not referred from another facility) + (heart rate/pulse) + respiratory rate + weight + Silverman-Anderson/Downes score + Head circumference + (Apgar score (1 or 5 minutes) / skin evaluation) + glycemia lab test + heat application + neonate was fed glucose (breastfed / oral serum / IV) + evaluated by a doctor + neonate was referred (if weight is < 1500 gr) + appropriate care:

- *if neonate has pneumonia:* antibiotics / referred to complete facility
- *if neonate has diarrhea:* liquids (breastmilk / oral rehydration salts) / referred to complete facility
- *if neonate has seizures:* anticonvulsants: (tazobactam / phenobarbital / levetiracetam / lidocaine / pentothal / tiobarbital) / referred to complete facility
- *if neonate has hypoglycemia:* IV glucose serum / referred to complete facility

Complete:

Observe the following in the record: gestational age calculation using Capurro or Ballard (if neonate was not referred from another facility) + classification of neonate by gestational age recorded (if neonate was not referred from another facility) + (heartrate/pulse) + respiratory rate + weight + Silverman-Anderson/Downesscore + Head circumference + (Apgar score (1 or 5 minutes) / skin evaluation) + glycemia lab test + heat application + neonate was fed glucose (breastfed / oral serum / IV) + evaluated by a doctor + appropriate care:

- *if neonate has pneumonia:* antibiotics

- *if neonate has diarrhea*: liquids (breastmilk / oral rehydration salts)
- *if neonate has seizures*: anticonvulsants (tazobactam / phenobarbital / levetiracetam / lidocaine / pentothal / tiobarbital)
- *if neonate has hypoglycemia*: IV glucose serum

Low birth weight

Basic:

Observe the following in the record: gestational age calculation using Capurro or Ballard (if neonate was not referred from another facility) + classification of neonate by weight recorded (if neonate was not referred from another facility) + (heart rate / pulse) + respiratory rate + weight + Silverman-Anderson/Downes score + Head circumference + (Apgar score (1 or 5 minutes) / skin evaluation) + glycemia lab test + heat application + neonate was fed glucose (breastfed / oral serum / IV) + evaluated by a doctor + neonate was referred (if weight is <1500 gr) + appropriate care:

- *if neonate has pneumonia*: antibiotics / referred to complete facility
- *if neonate has diarrhea*: liquids (breastmilk / oral rehydration salts) / referred to complete facility
- *if neonate has seizures*: anticonvulsants (tazobactam / phenobarbital / levetiracetam / lidocaine / pentothal / tiobarbital) / referred to complete facility
- *if neonate has hypoglycemia*: IV glucose serum / referred to complete facility

Complete:

Observe the following in the record: gestational age calculation using Capurro or Ballard (if neonate was not referred from another facility) + classification of neonate by weight recorded (if neonate was not referred from another facility) + (heart rate / pulse) + respiratory rate + weight + Silverman-Anderson/Downes score + Head circumference + (Apgar score (1 or 5 minutes) / skin evaluation) + glycemia lab test + heat application + neonate was fed glucose (breastfed / oral serum / IV) + evaluated by a doctor + appropriate care:

- *if neonate has pneumonia*: antibiotics
- *if neonate has diarrhea*: liquids (breastmilk / oral rehydration salts)
- *if neonate has seizures*: anticonvulsants (tazobactam / phenobarbital / levetiracetam / lidocaine / pentothal / tiobarbital)
- *if neonate has hypoglycemia*: IV glucose serum

Asphyxia (excluding cases referred to the facility)

Basic & Complete:

Observe the following in the record: (heart rate / pulse) + respiratory rate + Apgar score at 1 minutes + Apgar score at 5 minutes + heat application + glycemia test + oxygen saturation level (if severe asphyxia) + oxygen application (if severe asphyxia) + (AMBU / positive pressure ventilation / cardiac massage / endotracheal intubation (if severe asphyxia)) + evaluated by a doctor + referred to a complete facility (if severe asphyxia & basic facility)

*severe asphyxia is defined as 5-minute Apgar score ≤ 3 Sepsis

Basic:

Observe the following in the record: (heart rate / pulse) + temperature + respiratory rate + abdominal examination + antibiotics + evaluated by a doctor + referred to a complete facility (if septic shock)

Complete:

Observe the following in the record: (heart rate / pulse) + temperature + respiratory rate + abdominal examination + oxygen saturation level + blood biometry / (platelet count + leukocyte count + hemoglobin + hematocrit) + hemoculture + c-reactive protein + neutrophil band ratio/neutrophil absolute ratio + antibiotics + evaluated by a specialist

4080: Women with obstetric complications (sepsis, hemorrhage, severe pre-eclampsia, and eclampsia) managed according to the norm in the last 2 years

Source: Medical record review

Denominator: Total number of records of women with maternal complications (hemorrhage, severe pre-eclampsia, eclampsia, or sepsis) at basic & complete facilities in the sample

Formula:

Hemorrhage

Basic:

Observe the following in the record: (heart rate / pulse) + blood pressure + (ringer's lactate / hartmann's / saline solution) + appropriate care:

- *if incomplete/complicated abortion with hemorrhage:* AMEU / curettage / referred to complete facility
- *if ectopic/broken ectopic pregnancy:* laparotomy / salpingectomy / surgical repair / referred to complete facility*
- *if placenta previa with hemorrhage:* caesarean section / referred to complete facility
- *if placental abruption:* vaginal birth / caesarean section / referred to complete facility
- *if uterine rupture:* caesarean section / laparotomy / hysterectomy / surgical repair / referred to complete facility
- *if uterine atony:* uterotonic (oxytocin / misoprostol / methlergonovine) + (uterine massage / bimanual compression / uterine tamponade / compressive sutures / hysterectomy / referred to complete facility)
- *if uterine inversion:* (uterotonic (oxytocin / misoprostol / methlergonovine) + (reposition/restoration of the uterus under sedation or anesthesia with surgical or non-surgical techniques) / referred to complete facility
- *if total or partial placental retention / placental remnants / accretion:* (uterotonic (oxytocin / misoprostol / methlergonovine) + (manual extraction / curettage / laparotomy / hysterectomy) / referred to a complete facility

Complete:

Observe the following in the record: (heart rate / pulse) + blood pressure + hematocrit + hemoglobin + platelet count + (ringer's lactate / hartmann's / saline solution) + appropriate care:

- *if incomplete/complicated abortion with hemorrhage:* AMEU / curettage
- *if ectopic/broken ectopic pregnancy:* laparotomy / salpingectomy / surgical repair
- *if placenta previa with hemorrhage:* caesarean section
- *if placental abruption:* vaginal birth / caesarean section
- *if uterine rupture:* caesarean section / laparotomy / hysterectomy / surgical repair
- *if uterine atony:* uterotonic (oxytocin / misoprostol / methlergonovine) + (uterine massage / bimanual compression / aortal compression / uterine tamponade / compressive sutures / hysterectomy)
- *if uterine inversion:* uterotonic (oxytocin / misoprostol / methlergonovine) + reposition/restoration of the uterus under sedation or anesthesia with surgical or non-surgical techniques
- *if total or partial placental retention / placental remnants / accretion:* uterotonic (oxytocin / misoprostol / methlergonovine) + (manual extraction / curettage / laparotomy / hysterectomy)

Severe Pre-eclampsia & Eclampsia

Basic with referral:

Observe the following in the record: (heart rate / pulse) + blood pressure + respiratory rate + urine protein + magnesium sulfate + hydralazine/labetalol/nifedipine (if diastolic blood pressure is ever > 110)

Basic without referral and Complete:

Observe the following in the record: (heart rate / pulse) + blood pressure + respiratory rate + patellar reflex (complete only) + urine protein + platelet count + creatinine + uric acid + (aspartate aminotransferase / glutamic-oxalacetic transaminase) + (alanine aminotransferase / glutamic-pyruvic transaminase) + lactate dehydrogenase + magnesium sulfate + hydralazine/labetalol/nifedipine (if diastolic blood pressure is ever > 110)

Sepsis

Basic:

Observe the following in the record: (heart rate / pulse) + blood pressure + temperature + antibiotics: (amikacin / clindamycin / gentamycin / ampicillin / metronidazole / penicillin / crystalline penicillin / piperacillin / tazobactam / ceftriaxone / amoxicillin / nitrofurantoin / ciprofloxacin) + appropriate care:

- *if postpartum or post-caesarean endometritis:* antibiotics + (observation / referred to a complete facility)
- *if pelvic abscess:* antibiotics + (drainage / laparotomy / hysterectomy / surgical repair / referred to a complete facility)
- *if retention of placental remains:* antibiotics + (curettage / laparotomy / hysterectomy / referred to a complete facility)

Complete:

Observe the following in the record: (heart rate / pulse) + blood pressure + temperature + hematic biometry / (hemoglobin + hematocrit + platelet count + leukocyte count) + antibiotics: (amikacin / clindamycin / gentamycin / ampicillin / metronidazole / penicillin / crystalline penicillin / piperacillin / tazobactam / ceftriaxone / amoxicillin / nitrofurantoin / ciprofloxacin) + appropriate care:

- *if postpartum or post-cesarean endometritis*: antibiotics
- *if pelvic abscess*: antibiotics + (drainage / laparotomy / hysterectomy / surgical repair)
- *if retention of placental remains*: antibiotics + (curettage / laparotomy / hysterectomy)

4103: Routine newborn care with quality

Source: Medical record review

Denominator: Total number of postpartum records for live births at basic and complete facilities in the sample

Formula: Observe the following in the record: Vitamin K + prophylaxis application with (ophthalmic oxytetracycline / chloramphenicol) + curing of the umbilical cord with (water and chlorhexidine) + evaluation of the presence of malformations + BCG vaccine + APGAR score (at 1 or 5 minutes) + respiratory rate + weight + height + head circumference

6005: Cervical cancer screening

Source: Medical record review

Denominator: Total number of regular attention records in the past three months among women aged 25 – 49 years at ambulatory facilities in the sample

Formula: Observe the following in the record:

1. A positive or negative HPV, VIAA, or PAP screening result in the past year
 - *if positive*: evidence of notification within 30 days + evidence woman received notification

OR: 2. A negative HPV screening result in the past 5 years

OR: 3. A negative VIAA screening result in the past

OR: 4. A negative PAP screening in the past 4 years + at least three PAP screenings in the record

7500: Use of data for decision-making

Source: Health facility observation

Denominator: Total number of primary, departmental, and regional hospitals in the sample

Formula: Observe the following in the facility: Improvement plans observed for 4 of the past 6 months + for one randomly selected month: [a problem or gap in care identified + evidence of intervention proposal observed + dates for initiation and finalization of the intervention proposal observed]

B.3 Household monitoring indicators

1050: Children 0-59 months with hemoglobin <110g/L

Source: Household survey

Denominator: Total number of children aged 0-59 months in the household survey with measured hemoglobin

Formula: Hemoglobin level is above the following minimums based on community altitude:

- 110g/L if altitude is <1000
- 112g/L if altitude is $\geq 1000\text{m}$ & <1250m
- 115g/L if altitude is $\geq 1250\text{m}$ & <1750m
- 118g/L if altitude is $\geq 1750\text{m}$ & <2250m
- 123g/L if altitude is $\geq 2250\text{m}$ & <2750m
- 129g/L if altitude is $\geq 2750\text{m}$ & <3250m
- 137g/L if altitude is $\geq 3250\text{m}$ & <3750m
- 145g/L if altitude is $\geq 3750\text{m}$ & <4250m
- 155g/L if altitude is $\geq 4250\text{m}$ & <4750m
- 165g/L if altitude is $\geq 4750\text{m}$ & <5250m
- 177g/L if altitude is $\geq 5250\text{m}$

1070: Children 0-59 months with height <-2 SD of the mean of the reference population for age

Source: Household survey

Denominator: Total number of children aged 0-59 months in the household surveys whose height was measured

Formula: Total number of children aged 0-59 months whose measured height is less than -2 SD with respect to the median height-for-age in the reference population

1080: Women aged 15-49 with a live birth in the last year

Source: Household survey

Denominator: Total number of women 15-49 years of age in the household surveys

Formula: Total number of women 15-49 years with at least one live birth in the last year

1090: Women aged 15-19 with a live birth in the last year

Source: Household survey

Denominator: Total number of women 15-19 years of age in the household surveys

Formula: Total number of women 15-19 years with at least one live birth in the last year

2010: Women (age 15-49) and their partner who use modern contraceptives

Source: Household survey

Denominator: Total number of women aged 15-49 years who are married or partnered and do not report the following characteristics: does not have sexual relations, virgin, menopausal, infertile, pregnant, or wants to become pregnant (these women are considered in need of contraception)

Formula: Total number of women aged 15-49 years in need of contraception who are using a modern form of contraception, including injectables, female sterilization, male sterilization, oral contraceptives, intrauterine device (IUD), contraceptive implant, condoms (male or female), diaphragm, sponge and spermicide, emergency contraception or other modern method

2020: Women aged 15-49 who did not wish to become pregnant and who were not using or did not have access to contraceptive methods

Source: Household survey

Denominator: Total number of women aged 15-49 years who are married or partnered and do not report the following characteristics: does not have sexual relations, virgin, menopausal, infertile, pregnant, or wants to become pregnant (these women are considered in need of contraception)

Formula: Total number of women aged 15-49 years in need of contraception who are not using a modern form of contraception (injectables, female sterilization, male sterilization, oral contraceptives, intrauterine device (IUD), contraceptive implant, condoms (male or female), diaphragm, sponge and spermicide, emergency contraception or other modern method)

2030: Women (age 15-49) who report having stopped using a method of contraception during the previous year

Source: Household survey

Denominator: Total number of women 15-49 years of age who are married or partnered who have used a method of contraception in the past year and who are considered in need of contraception

Formula: Total number of women 15-49 years of age who are considered in need of contraception and who report having stopped using a method of contraception in the past year

2040: Women (age 15-49) who received contraception counseling by Community Health Worker or at a health facility

Source: Household survey

Denominator: Total number of women 15-49 years of age in the household surveys

Formula: Woman reports having received information about contraception in the last 12 months by health facility personnel or community health worker

3010: Women aged 15-49 who received at least one antenatal care visit by skilled personnel before their most recent birth in the last two years

Source: Household survey

Denominator: Total number of women 15-49 years of age with a live birth in the last two years

Formula: Woman reports having at least one antenatal care visit with skilled personnel (doctor, nurse, or auxiliary nurse) before her most recent birth in the last two years

3020: Women aged 15-49 who received at least four antenatal care visits by skilled personnel before their most recent birth in the last two years

Source: Household survey

Denominator: Total number of women 15-49 years of age with a live birth in the last two years

Formula: Woman reports having at least four antenatal care visits with skilled personnel (doctor, nurse, or auxiliary nurse) before her most recent birth in the last two years

4010: Women who had a in-facility delivery attended by doctor, nurse, or auxiliary nurse for most recent delivery in the last 2 years

Source: Household survey

Denominator: Total number of women 15-49 years of age with a live birth in the last two years

Formula: Woman reports giving birth in a health facility (public or private hospital, health center/clinic, doctor's office or other center) with skilled personnel (doctor, nurse, or auxiliary nurse) for her most recent birth in the last two years

4030: Women aged 15-49 who received postpartum care by skilled personnel within 7 days after their most recent birth in the last two years

Source: Household survey

Denominator: Total number of women 15-49 years of age with a live birth in the last two years

Formula: Woman reports having received postpartum care by skilled personnel (doctor, nurse, or auxiliary nurse) in the first 7 days after her most recent birth in the last two years

4101: Infants receiving neonatal care by skilled personnel within 10 days of birth in the last two years

Source: Household survey

Denominator: Number of live births by women 15-49 years of age in the last two years

Formula: Number of children born in the last two years who received neonatal care by skilled personnel (doctor, nurse, or auxiliary nurse) within 10 days of delivery

4110: Women aged 15-49 with a birth in the last two years who can recognize at least five danger signs in newborns

Source: Household survey

Denominator: Total number of women 15-49 years of age with a live birth in the past two years in the household surveys

Formula: Number of women 15 to 49 years of age with a live birth in the last two years and who can recognize at least 5 danger signs in newborns. Danger signs include: fever, seizure, convulsions, cyanosis, difficulty breathing, paleness, flaccidity, lethargy, cold to touch, bleeding, jaundice, loss of appetite, diarrhea, vomiting, or distended abdomen, pus or redness of the bellybutton, eyes, or skin, or swelling of the joints and extremities

4120: Women aged 15-49 who used a maternal waiting home during their most recent pregnancy in the last two years

Source: Household survey

Denominator: Total number of women 15-49 years of age with a live birth in the last two years

Formula: Woman reports using a maternal waiting home during their most recent pregnancy in the last two years

5030: Children 18-59 months who received 2 doses of deworming in the last year

Source: Household survey

Denominator: Total number of children aged 18-59 months in the household surveys

Formula: Caregiver reports child receiving at least 2 doses of deworming in the last year

5040: Children 0-5 months who were exclusively breastfed on the previous day

Source: Household survey

Denominator: Total number of children aged 0-5 months in the household surveys

Formula: Caregiver reports that child consumed only breast milk (breastfed or from a bottle) on the previous day

5050: Children born in the last two years who were breastfed within one hour after birth

Source: Household survey

Denominator: Number of live births by women 15-49 years of age in the last two years

Formula: Mother reports having breastfed the child during the first hour after the birth

B.4 Health facility monitoring indicators

3030: Women of reproductive age who received at least four antenatal care (ANC) visits to standard for their most recent pregnancy in the last two years and attended a health facility for antenatal care

Source: Medical record review

Denominator: Total number of ANC records at ambulatory and basic facilities in the last two years, excluding women who did not receive antenatal care in-facility

Formula: Ambulatory: Observe the following in the record: woman had at least 4 ANC visits + physical checkups performed at each visit (weight + blood pressure + fundal height (if gestational age >20 weeks) + fetal heart rate (if gestational age >20 weeks) + fetal movement (if gestational age >20 weeks)). Lab tests performed at least once: blood glucose level + HIV test + Hb level + urinalysis + Rh factor + blood group + VDRL/RPR.

4050: Institutional postpartum patients who were evaluated and registered in clinical records within two hours after birth in the last two years

Source: Medical record review

Denominator: Total number of postpartum records at basic and complete facilities, excluding women who were transferred to the facility and women who delivered by caesarean section

Formula: Basic & Complete: Observe the following in the record: Woman had four checks of blood pressure + temperature + heart rate/pulse in the first two hours after delivery. Woman had one check of blood pressure + temperature + heart rate/pulse at discharge.

4065: Partograph completion for uncomplicated deliveries in last two years

Source: Medical record review

Denominator: Total number of delivery records at basic and complete facilities, excluding women who arrived for elective c-section or imminent birth

Formula: Basic & Complete: Observe the following in the record: Partograph included and filled out + Alert curve and fetal heart rate recorded (if dilation >4.5cm) + Note exists within 30 minutes if alert curve surpassed + note exists within 30 minutes if fetal heart rate < 110 bpm

4095: Active management of the third stage of labor for uncomplicated deliveries in last two years

Source: Medical record review

Denominator: Total number of delivery records at basic and complete facilities

Formula: Basic & Complete: Observe the following in the record: Time and date of administration of oxytocin / other uterotonic + Uterine massage

7000: Cold chain

Source: Health facility observation

Denominator: Total number of ambulatory and basic facilities that store vaccines

Formula: Ambulatory & Basic: For each functional refrigerator at the facility, observe the following: Temperature monitoring chart + Temperature recorded twice daily in past 30 days, excluding weekends and holidays

7010: Child care services

Source: Health facility observation

Denominator: Total number of ambulatory and basic facilities that provide child care services

Formula:

Ambulatory & Basic: Observe the following in the facility: Pediatric scale + Height rod + Stethoscope + Thermometer + Growth-development card. Continuous three-month supply of the following: Pentavalent / (DPT + Hep B + HiB) vaccine + Polio vaccine + MMR vaccine + Rotavirus vaccine + Pneumococcal vaccine + BCG vaccine + Ferrous sulfate / Zinc gluconate / Zinc sulfate + Albendazole / Mebendazole

Basic only: Pediatric stethoscope. Continuous three month supply of: Erythromycin / Amoxicillin / Benzylpenicillin

7020: Pre/postnatal care services

Source: Health facility observation

Denominator: Total number of ambulatory and basic facilities that provide pre/postnatal care services

Formula:

Ambulatory & Basic: Observe the following in the facility: Scale with height rod + Gynecological table + Lamp + Obstetric tape / CLAP + Blood pressure apparatus + Stethoscope + Sphygmomanometer + Pregnancy wheel

Basic only: Observe the following: IUD kit + if the basic facility has a laboratory: Rapid HIV test + Rapid syphilis test + Urinalysis equipment + Glucometer + Blood test equipment + Microscope + Automated cell counter

7030: Emergency care services

Source: Health facility observation

Denominator: Total number of ambulatory and basic facilities that provide pre/postnatal care services

Formula: Basic: Continuous three-month supply of the following: Dexamethasone + Penicillin crystals/ IV ampicillin / Amoxicillin / Cephalexin / Nitrofurantoin + Gentamicin + Magnesium sulfate + Hydralazine + Ergobasine / Ergonovine maleate / Ergometrine / Oxytocin

7050: Contraceptive services

Source: Health facility observation

Denominator: Total number of ambulatory and basic facilities that store contraceptive methods

Formula:

Ambulatory & Basic: Continuous three-month supply of the following: Condom + Oral contraceptive pill +
Injectable contraceptive

Basic only: Intrauterine device

8870: Sociocultural conditions

Source: Health facility observation

Denominator: Total number of centros de salud in the sample

Formula: Centros de Salud: Observe delivery area with sociocultural accommodations available to patients

Appendix C: Census and household sample design and methods

C.1 Sample size

Sample sizes were determined based on IDB's pre-specified plan for the third operation measurement to complete a full census of sampled segments (described in section A.2 "Sampling Procedures," below), followed by a survey of 1,414 selected eligible households in intervention areas, and 606 selected eligible households in comparison areas. Households were eligible if they had at least one child aged 0-59 months or one woman aged 15-49 years.

In order to achieve the desired sample size of 2,010 households, we sought to complete interviews with residents of 30 randomly selected households in each of the 47 randomly selected segments in intervention areas (20 in comparison areas). More specifically, we drew a sample of 30 randomly selected households with age-eligible women and/or children as residents, and then drew a backup sample of 10 households from the remaining households with eligible participants in the segment. In some cases, selected households were absent or declined to participate in the SMI-Nicaragua Household Survey. These households were replaced in order by households from the backup sample for the same segment. In each selected household, all eligible women and children were selected to participate in the study. Informed consent was sought from each respondent to the household questionnaire and women's health interview, and from the guardian of each child participating in physical measurements. Occasionally, one or more eligible participants refused the interview despite other household members participating, or a survey was refused in course, resulting in a partially complete household result. Data from partially complete households are used wherever individual modules are sufficiently complete. Because multiple interviewers worked the sample simultaneously, in a handful of instances more than 30 surveys were completed.

C.2 Sampling procedures

IDB identified 19 intervention municipalities in which to conduct the SMI household survey for the Initiative on the basis of their high concentration of residents in the country's lowest wealth quintile, and 4 comparison municipalities with similar socioeconomic characteristics and ethnic composition. From these 23 municipalities, a two-stage clustered random sample of eligible households was selected.

In this section, we describe the random sampling procedures for selecting the segments from the target area, and the households within the segment. An alternative sample was also selected in the event that the survey could not be conducted in the selected segments. Below we describe the selection of the primary and alternate samples.

C.2.1 Cluster sampling

Cluster sample sizes were determined based on the total estimated household sample size divided by a fixed cluster size " μ " of 30 households per segment. The third operation primary sample of 47 intervention and 20 comparison clusters (segments) was randomly selected from a total of 1774 intervention segments in 19 municipalities and 281 comparison segments in 4 municipalities which, based on data from the 2005 Nicaragua Population Census, contained 120,786 and 28,482 occupied households, respectively. As stated previously, segments were selected in each study arm with probability proportional to size and with replacement, as follows:

Size was represented by the number of occupied households within the segment, based on data from the 2005 Nicaragua Population Census. We generated a variable for the cumulative number of households in each of the intervention and comparison sampling frames. We divided the cumulative total by the number of segments we meant to sample to obtain an interval length “ Δ .” A random starting point “ Σ ” was drawn from a uniform distribution between 1 and the interval length Δ . The n^{th} segment in the sample was the first segment whose cumulative number of households was greater than $\Sigma + (n - 1) * \Delta$.

After selecting the 67 total segments to be surveyed, a set of 30 alternate segments in intervention areas and 25 alternate segments in comparison areas were randomly selected with probability proportional to size. These segments could be used in the event that any of the selected segments could not be surveyed and needed to be replaced due to security concerns, community rejection of the study, or a high proportion of absent households. In Nicaragua in the third operation survey, the same community was found to have been selected twice in the sample, so a replacement segment was provided in the same municipality. At the baseline, safety issues in the Department of Jinotega and especially in the North Caribbean Coast Autonomous Region (RACCN, Región Autónoma de la Costa Caribe Norte) complicated data collection. Though no personnel were injured, a very threatening event occurred in the RAAN, where interviewers were assaulted, threatened, and tied. In order to avoid becoming an easy target for future violent events in the regions, we were forced to stop activities in that region, and 22 selected segments were not surveyed.

C.2.2 Household sampling

Within each randomly selected cluster, a complete household listing exercise was carried out, enabling the systematic selection of households for participation in the survey, based on household composition. All households in which women aged 15-49 years and/or children aged 0-59 months resided were eligible to be selected for the survey. Eligible households were sorted according to a random variable. The first 25 households with eligible children were selected for participation. The first five households with eligible women only were selected to complete the sample of 30 households. Ten additional households were identified as an alternate sample, eight with eligible children and two with eligible women only. These alternate households were substituted in order for selected households that were absent throughout the data collection or refused participation in the study.

C.3 Weighting methodology

Survey weights reflect the three-stage cluster sampling design of the study. The primary sampling unit is referred to as the “segment.” The segment is censused, and 30 households with eligible participants selected at random. Within selected households, all women 15-49 years of age and all children 0-59 months of age are selected for participation in the survey. Design weights for households, women and children were generated according to the inverse probability of selection of the unit and incorporated into the merged datasets for analyses. The weights were calculated as follows for households:

Weight =

$$\frac{1}{p(\text{selecting Household } Y)} = \frac{1}{p(\text{selecting Segment } X) * p(\text{selecting Household } Y \text{ in segment } X)}$$



where

$$p(\text{selecting Segment } X) = \frac{\# \text{ occupied households in Segment } X \text{ in 2013 Population Census}}{\text{Total } \# \text{ occupied households in target municipalities in 2013 Population Census}} * \# \text{ draws}$$

and the number of draws corresponds to the number of segments in the corresponding study arm (47 for intervention areas and 20 for comparison areas at the third operation), and the total number of occupied households in target municipalities in the 2005 Nicaragua Population Census corresponds to 120,786 in intervention areas and 28,482 in comparison areas, and

if the household includes children under 5 according to the SMI-Nicaragua census:

$$p(\text{selecting household } Y \text{ in segment } X) = \frac{\# \text{ households with age-eligible children interviewed for SMI in segment } X}{\# \text{ occupied households with age-eligible children in Segment } X \text{ from SMI census}}$$

or if the household does not include children under 5 according to the SMI-Nicaragua census:

$$p(\text{selecting household } Y \text{ in segment } X) = \frac{\# \text{ households with eligible women but no eligible children interviewed for SMI in segment } X}{\# \text{ occupied households with age-eligible women but no children in Segment } X \text{ from SMI census}}$$

Minor modifications to this formula were used to calculate weights for women and children as follows:

$$p(\text{selecting woman } Z) = \frac{p(\text{selecting Segment } X) * p(\text{selecting Household } Y \text{ in Segment } X)}{\text{average number of women 15-49 years old per household in SMI census}} * p(\text{selecting Woman } Z \text{ in household } Y)$$

where the average number of women 15-49 years old per household in the sample was 1.08 in intervention areas and 1.09 in comparison areas (according to the SMI-Nicaragua Household Census), and

if the household includes children under 5 according to the SMI-Nicaragua census:

$$p(\text{selecting Household } Y \text{ in Segment } X) = \frac{\# \text{ households with eligible children completing women's health survey for SMI in Segment } X}{\# \text{ occupied households with age-eligible children in Segment } X \text{ from SMI census}},$$

or if the household does not include children under 5 according to the SMI-Nicaragua census:

$p(\text{selecting Household } Y \text{ in Segment } X)$

$$= \frac{\# \text{ households with eligible women but not children completing women's health survey for SMI in Segment } X}{\# \text{ occupied households with age-eligible women but not children in Segment } X \text{ from SMI census}},$$

and

$p(\text{selecting Woman } Z \text{ in Household } Y) =$

$$\frac{\# \text{ women in Household } Y \text{ completing the survey}}{\# \text{ women 15-49 years old residing in Household } Y \text{ from SMI census}},$$

and

$p(\text{selecting Child } W)$

$$= \frac{p(\text{selecting Segment } X) * p(\text{selecting Household } Y \text{ in Segment } X)}{\text{average number of children 0-59 months old per household in sample}} * p(\text{selecting child } W \text{ in Household } Y)$$

where the average number of children 0-59 months old per household in the sample was 0.47 in intervention areas and 0.38 in comparison areas (according to the SMI-Nicaragua Household Census), and

$p(\text{selecting Household } Y \text{ in Segment } X)$

$$= \frac{\# \text{ households completing children's health survey for SMI in Segment } X}{\# \text{ occupied households with age-eligible children in Segment } X \text{ from SMI census}},$$

and

$p(\text{selecting Child } W \text{ in Household } Y)$

$$= \frac{\# \text{ children in Household } Y \text{ completing the survey}}{\# \text{ children 0-59 months residing in Household } Y \text{ from SMI census}},$$

The weights yielded results which were similar to the unweighted results.

C.4 Sampling errors

As described above, a random sample of eligible households was selected from each of 47 clusters (segments) in intervention areas and 20 clusters in comparison areas which had been randomly sampled with probability proportional to size from the target intervention and comparison areas of the initiative. Although cluster sampling can improve efficiency when the target population is spread out over a large area, the resultant sample consists of observations that are not completely independent of one another. The confidence intervals presented throughout this report account for this intra-class correlation, using Taylor-linearized variance estimation.

Appendix D: Comparison area results

D.1 Comparison area household survey results

Figure D.1: Map of household comparison segments in the Nicaragua third operation



• Household segment

D.1.1 Household characteristics

Figure D.2: Age and sex of census sample, unweighted percent distribution of de facto household population by five-year age groups, baseline survey, comparison

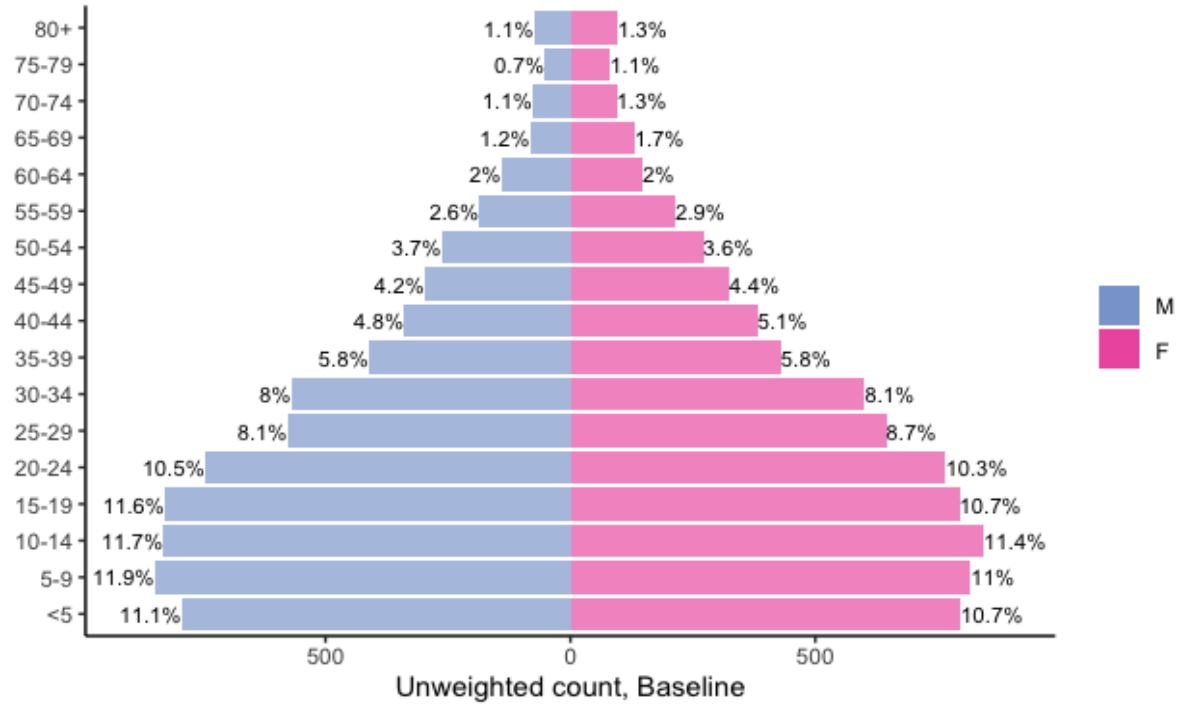


Figure D.3: Age and sex of census sample, unweighted percent distribution of de facto household population by five-year age groups, third operation survey, comparison

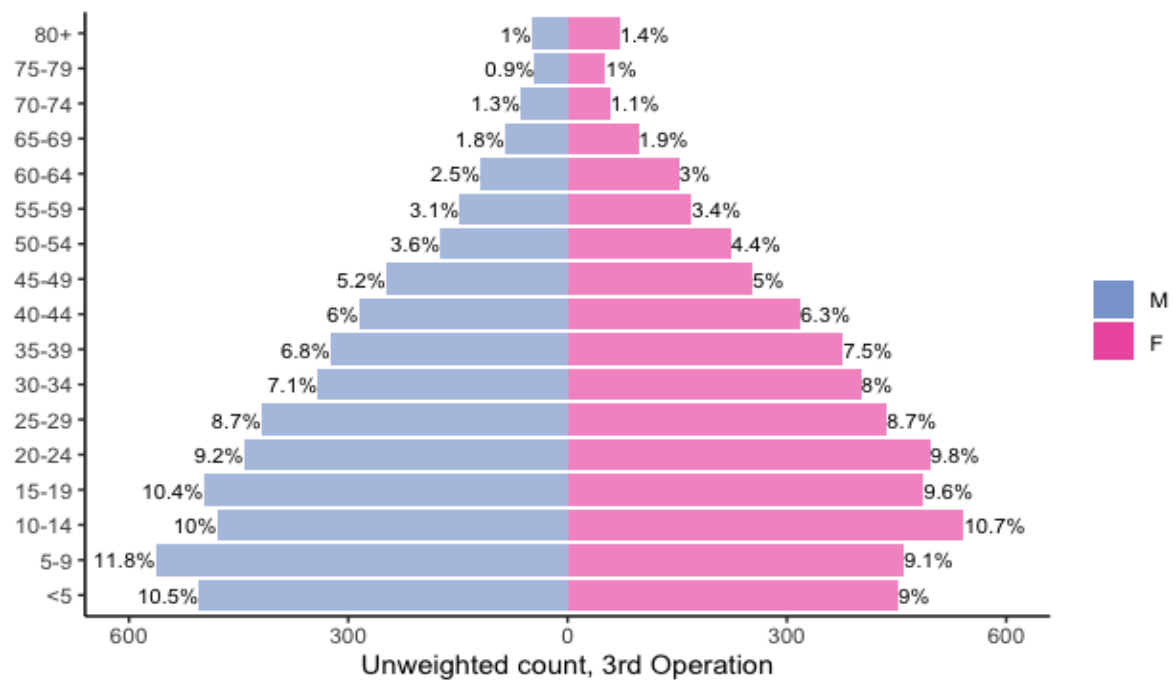


Table D.1: SMI household survey sample sizes: number of total households, women 15-49 years of age, and children 0-59 months, comparison

	Baseline	2nd Operation	3rd Operation
Households	762	774	606
Women	1103	1047	756
Children	818	738	552

Table D.2: Household characteristics, SMI household sample, comparison

	Baseline			2nd Operation			3rd Operation		
	n	%	CI	n	%	CI	n	%	CI
Dual-headed household	530	69.7	(63.4 - 75.9)	571	73.7	(67.1 - 80.3)	403	66.0	(58.5 - 73.4)
Single head, female	180	23.8	(17.9 - 29.6)	170	21.3	(15.2 - 27.4)	155	28.8	(21.8 - 35.7)
Single head, male	52	6.6	(3.9 - 9.2)	33	5.0	(2.1 - 7.8)	48	5.2	(3.1 - 7.4)

Dual-headed households are those where (a) two individuals were identified as "head" by the respondent or (b) both the person identified as "head" and his or her spouse or partner are household members.

Table D.3: Number of usual household members, SMI household sample (percentiles), comparison

Operation	N	DK/DTR	Minimum	25th Percentile	Median	75th Percentile	Maximum
Baseline	762	0	1	4	5	6	19
2nd Operation	774	0	1	3	4	5	18
3rd Operation	606	0	2	3	4	5	17

DK/DTR = Number of 'Don't know' and 'Decline to Respond' responses.

Table D.4: Total itemized per-capita expenditure quintiles, nominal Nicaragua Córdoba*, comparison

Operation	N	DK/DTR	p20	p40	p60	p80
Baseline	703	0	346	612	895	1,504
2nd Operation	736	0	575	981	1,469	2,252
3rd Operation	495	0	806	1,340	1,862	2,892

*Not adjusted for inflation.

D.1.2 Women's health

Figure D.4: Age of respondents, unweighted, comparison

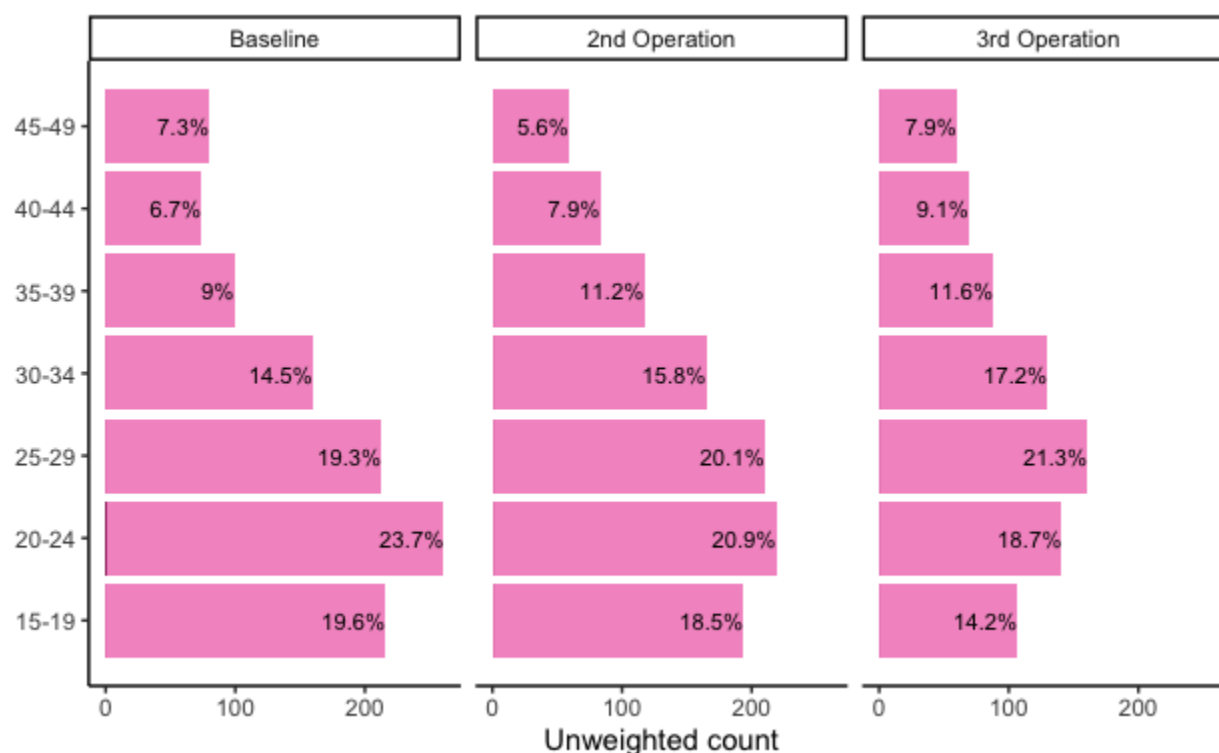


Table D.5: Demographic characteristics of respondents, unweighted, comparison

	Baseline		2nd Operation		3rd Operation	
	n	%	n	%	n	%
Marital status*						
Single	364	33	251	24	175	23.1
Married	284	25.7	291	27.8	194	25.7
Civil union/partnered	420	38.1	362	34.6	321	42.5
Divorced	4	0.4	8	0.8	3	0.4
Separated	26	2.4	129	12.3	60	7.9
Widowed	4	0.4	6	0.6	3	0.4
Other	0	0	0	0	0	0
Don't know	0	0	0	0	0	0
Decline to respond	1	0.1	0	0	0	0
Respondent's relationship to head of household						
Head of household	126	11.4	140	13.4	151	20
Spouse	208	18.9	327	31.2	293	38.8
Partner	239	21.7	119	11.4	20	2.6
Biological child	330	29.9	305	29.1	178	23.5

	Baseline		2nd Operation		3rd Operation	
	n	%	n	%	n	%
Adopted or stepchild	17	1.5	10	1	8	1.1
Grandchild	29	2.6	33	3.2	15	2
Niece	11	1	11	1.1	9	1.2
Mother	1	0.1	1	0.1	1	0.1
Sister	16	1.5	14	1.3	8	1.1
Daughter-in-law	91	8.3	60	5.7	58	7.7
Sister-in-law	6	0.5	4	0.4	1	0.1
Grandmother	0	0	0	0	0	0
Mother-in-law	0	0	1	0.1	2	0.3
Other relative	2	0.2	3	0.3	3	0.4
Unrelated person	18	1.6	11	1.1	6	0.8
Not registered**	2	0.2	5	0.5	1	0.1
Other	7	0.6	3	0.3	2	0.3
Don't know	0	0	0	0	0	0
Decline to respond	0	0	0	0	0	0

*At baseline, marital status is reported by the respondent in the census. In the second and third operations, marital status is reported by the woman at the start of the Maternal Health Questionnaire.

** Relationship to the head of household was not collected for women who were not registered in the SMI census and added at the time of the household survey.

Table D.6: Education attainment and literacy, comparison

	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Ever attended school	1096	87.6	(81.7 - 91.8)	1044	91.4	(87.3 - 94.2)	754	90.8	(86.4 - 93.8)
Attended literacy course	1097	15.5	(11.8 - 20)	1043	12.8	(8.6 - 18.6)	754	13.1	(8.6 - 19.4)

Table D.7: Educational attainment and literacy, detailed, comparison

	Baseline			2nd Operation			3rd Operation		
	n	%	CI	n	%	CI	n	%	CI
Educational attainment and literacy									
Primary	419	45.2	(35.8 - 54.5)	350	39.1	(28.8 - 49.4)	255	37.4	(28.5 - 46.2)
Secondary/High School*	368	36.3	(30.5 - 42.1)	371	39.6	(34.4 - 44.8)	288	41.9	(35.6 - 48.1)
University	155	13.2	(7.8 - 18.7)	195	19.4	(11.2 - 27.6)	132	18.1	(10.4 - 25.8)
Technical school	46	5.3	(2.3 - 8.3)	25	1.9	(0.9 - 2.9)	17	2.7	(0.8 - 4.6)
Don't know	0	0	-	0	0	-	0	0	-
Decline to respond	0	0	-	0	0	-	0	0	-
Literacy									
Cannot read at all	109	10.9	(5.5 - 16.2)	101	8.8	(5.6 - 12.1)	69	9.7	(5.1 - 14.2)

	Baseline			2nd Operation			3rd Operation		
	n	%	CI	n	%	CI	n	%	CI
Can read parts	136	12.5	(7.1 - 17.9)	96	10.4	(7.6 - 13.1)	47	7.3	(5 - 9.6)
Can read entire sentence	840	75.3	(68 - 82.7)	843	80.7	(75.6 - 85.8)	630	82.3	(77.5 - 87)
Visually impaired	8	1.3	(0 - 3)	2	0.1	(0 - 0.3)	6	0.8	(0 - 1.7)
Don't know	3	0	-	3	0	-	1	0	-
Decline to respond	1	0	-	0	0	-	1	0	-

*At the first and second operations 'Secondary' and 'High School' were separate categories. They are presented here together for comparability with third operation, where the response options included a single category 'Secondary/High School'

Table D.8: Employment, comparison

	Baseline			2nd Operation			3rd Operation		
	n	%	CI	n	%	CI	n	%	CI
Employment status									
Homemaker	725	62.8	(54.7 - 70.9)	617	56	(46.1 - 66)	479	62	(53.8 - 70.3)
Employed/paid for work	189	17.5	(12.6 - 22.4)	184	17	(11.4 - 22.6)	121	18.6	(13.2 - 24)
Self-employed	59	5	(2.8 - 7.2)	96	9.4	(5.1 - 13.8)	99	11.7	(7.8 - 15.6)
Student	104	12.7	(7.5 - 17.9)	127	14.9	(11.7 - 18.2)	50	7	(4 - 9.9)
Employed by a family member without pay	7	0.4	(0.1 - 0.6)	8	1.2	(0.1 - 2.3)	2	0.4	(0 - 1)
Employed, but did not work in last week	3	0.1	(0 - 0.3)	4	0.6	(0 - 1.6)	2	0.3	(0 - 0.7)
Unable to work due to disability	2	0.9	(0 - 2.4)	6	0.7	(0 - 1.4)	1	0.1	(0 - 0.1)
Retired	1	0.1	(0 - 0.2)	1	0.1	(0 - 0.2)	0	0	-
Employed in a cooperative	6	0.5	(0 - 1.1)	0	0	-	0	0	-
Don't know	0	0	-	0	0	-	0	0	-
Decline to respond	1	0	-	1	0	-	0	0	-
Occupational role, among women employed and being paid for work									
Employee	177	92.7	(85.6 - 99.7)	172	90.9	(81.9 - 99.9)	119	98.5	(96.2 - 100)
Independent contractor	7	5	(0 - 10.1)	6	2.8	(0 - 6.3)	2	1.5	(0 - 3.8)
Employer	3	0.8	(0 - 1.7)	0	0	-	0	0	-
Proprietor	2	1.5	(0 - 3.8)	6	6.3	(0 - 14.8)	0	0	-
Don't know	0	0	-	0	0	-	0	0	-
Decline to respond	0	0	-	0	0	-	0	0	-

Table D.9: Current use of modern contraceptive methods, women 15-49 years of age who are married or partnered and in need of contraception (MI2010/2030), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women currently in need of contraception	702	76.9	(70.6-82.2)	651	85.1	(79.5-89.4)	515	85.4	(79.3-89.9)
Women using any contraception, among all women	702	73.1	(67.4-78.2)	651	76.3	(70.3-81.3)	515	79.5	(73.8-84.2)
Women using any method, among those in need	599	90.7	(87.1-93.3)	581	84.5	(78.4-89.1)	454	90.1	(85.4-93.3)
Women (age 15-49) currently using a modern method of contraception (MI2010)	599	89.1	(85.7-91.8)	581	83.8	(77.7-88.5)	454	89.2	(84.9-92.3)
Women (age 15-49) who report having stopped using a method of contraception during the previous year (MI2030)	547	3.8	(1.9-7.3)	528	5	(1.5-15.5)	319	3.5	(2.1-5.7)

Table D.10: Proximity to nearest health facility (percentiles), comparison

Operation	N	DK/DTR	Minimum	25th Percentile	Median	75th Percentile	Maximum
Distance, km							
Baseline	968	129	0	1	1.5	5	600
2nd Operation	849	196	0	0.4	1	4	60
3rd Operation	514	240	0	0.3	1	2	30
Travel time, min							
Baseline	1,061	8	1	15	30	60	2,700
2nd Operation	975	20	1	10	15	60	2,400
3rd Operation	744	10	1	10	15	30	2,700

Table D.11: Women in the household surveys with a live birth in the past year (MI1080/MI1090), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women aged 15-49 with a live birth in the last year (MI1080)	1097	10.5	(8.9-12.4)	1045	6.2	(5-7.8)	754	7.5	(6.1-9.2)
Women aged 15-19 with a live birth in the last year (MI1090)	215	8	(5.2-12)	193	4.3	(2.7-6.8)	107	10.9	(6.9-16.6)

Table D.12: Proportion of women who can recognize at least 5 danger signs in newborns (MI4110), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women (age 15-49) with a birth in the last two years who can recognize at least 5 danger signs in newborns (MI4110)	318	24.9	(20.2-30.2)	269	28.7	(19.4-40.2)	169	11	(5.7-20.3)

Table D.13: Contraception counseling by health care providers or community health workers (MI2040), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Married or partnered women (age 15-49) who received contraception counseling by CHW or at facility (MI2040)	702	39.6	(31.9-47.9)	649	31.2	(25.5-37.6)	414	44.8	(36.5-53.4)

D.1.3 Obstetric care

Table D.14: Antenatal care coverage for most recent birth in the last two years, women 15-49 years of age (MI3010/MI3020), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women (age 15-49) who received at least one antenatal care visit by skilled personnel in their most recent pregnancy in the last two years (MI3010)	413	96.2	(92.6-98.1)	338	93.9	(89.5-96.6)	236	96.8	(92.9-98.6)
Women (age 15-49) who received at least four antenatal care visits by skilled personnel in their most recent pregnancy in the last two years (MI3020)	411	84.7	(74.8-91.2)	335	81.6	(75.2-86.7)	233	86.3	(80-90.8)

Table D.15: Travel time in minutes to health facility for delivery, most recent birth in the last two years, comparison

Operation	N	DK/DTR	Minimum	25th Percentile	Median	75th Percentile	Maximum
Baseline	383	8	1	30	60	120	2,700
2nd Operation	297	19	1	14	50	120	4,320
3rd Operation	225	7	2	15	40	120	1,800

Table D.16: In-facility delivery with skilled birth attendant: most recent birth in the last two years, women 15-49 years of age (MI4010), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women who delivered in any facility	413	93.4	(87.7-96.5)	338	91.8	(81.8-96.6)	237	97.9	(95-99.1)
Woman who delivered with skilled birth attendant	413	93.7	(87.9-96.8)	338	94.1	(83.8-98)	237	98.6	(95.4-99.6)
Women (age 15-49) who delivered in facility with skilled attendant in their most recent pregnancy in the last two years (MI4010)	413	92.8	(87.3-96)	338	91.6	(81.8-96.4)	237	97.9	(95-99.1)

Table D.17: Early initiation of breastfeeding for most recent birth in the past two years, women 15-49 years of age (MI5050), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children born in the last two years who were breastfed within one hour after birth (MI5050)	425	79.6	(74.2-84.1)	342	76.4	(68-83.1)	241	66.1	(58.1-73.2)

Table D.18: Postpartum checkup for mother for most recent birth in the past two years, women 15-49 years of age (I4030/MI4030), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Skilled postpartum care visit within 10 days (doctor, nurse, or auxiliary nurse)	413	74.1	(67.9-79.5)	335	58.4	(50.7-65.7)	235	68.2	(59.6-75.7)
Checked after in-facility delivery*	-	-	-	313	92.5	(87.5-95.6)	232	97.4	(93.9-98.9)
Women (age 15-49) who received postpartum care within 10 days or before discharge with skilled personnel in their most recent pregnancy in the last two years (I4030)**	413	74.1	(67.9-79.5)	338	89.4	(82.5-93.8)	238	97.6	(94.4-99)
Women (age 15-49) who had a postpartum care visit within 7 days with skilled personnel in their most recent pregnancy in the last two years (MI4030)	413	66.3	(61.2-71)	335	46.8	(39.6-54.2)	235	63.3	(53.7-72)

*Not asked at baseline.

**The second follow-up survey included an additional question that asked if women were checked before discharge after delivering in facility. If a woman was checked before discharge, she was considered to have passed this indicator. Due to the addition of this question, the baseline and follow-up values are not strictly comparable.

Table D.19: Postnatal checkup for neonate for woman's most recent birth in the past two years, women 15-49 years of age (MI4101), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Infant was ever checked	373	78.6	(71.5-84.3)	309	90.1	(85.6-93.4)	202	97.2	(94.5-98.6)
Infant received postnatal care by skilled personnel within 24 hours of birth	373	34.7	(27.8-42.3)	309	27.8	(22.8-33.3)	202	44	(37.9-50.3)
Infant received postnatal care by skilled personnel within 10 days of birth (MI4101)	373	72.7	(65.6-78.9)	309	78.9	(72.9-83.8)	202	91.3	(86.9-94.3)

Table D.20: Use of maternal waiting homes for most recent birth in the past two years, women 15-49 years of age (MI4120), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Women (age 15-49) who used a maternal waiting home during their most recent pregnancy in the last two years (MI4120)	413	14.5	(8.6-23.5)	338	20.9	(13.9-30.1)	238	38.7	(24.9-54.7)

D.1.4 Child health

Figure D.5: Age and sex of children aged 0-59 months in child health survey or anthropometric measures of the de facto population by six- to twelve-month age groups, baseline survey unweighted, comparison

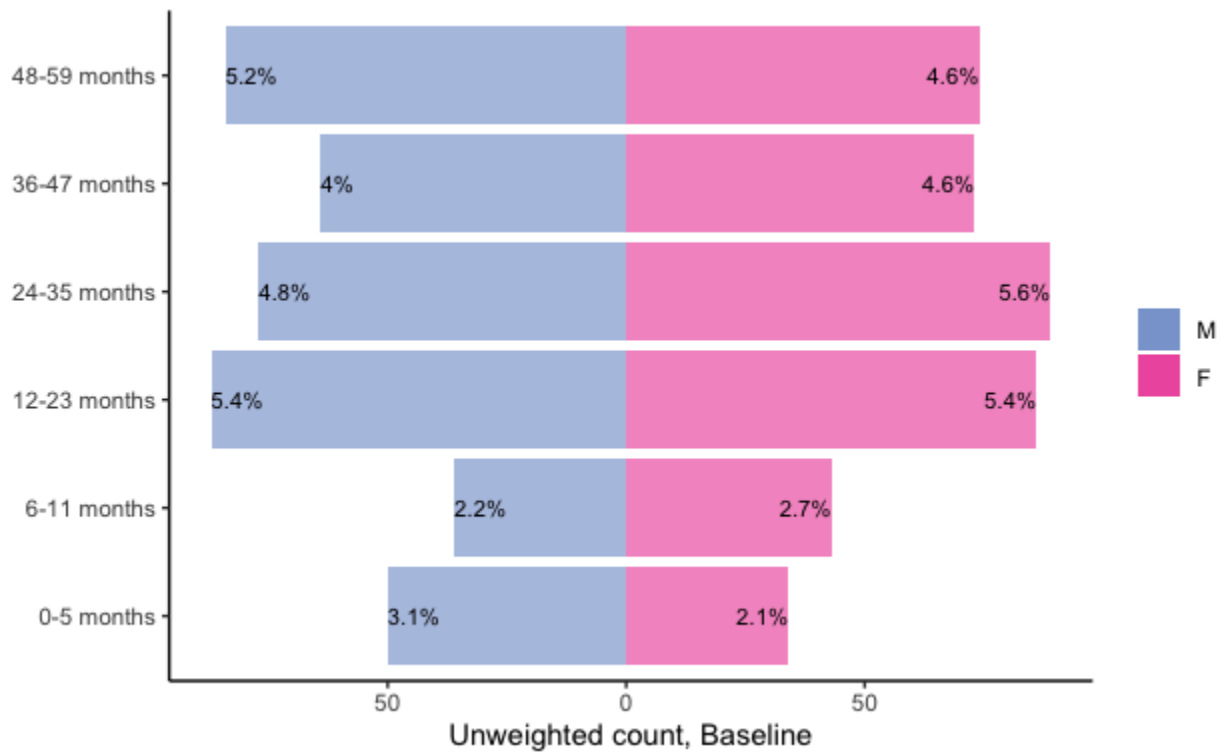


Figure D.6: Age and sex of children aged 0-59 months in child health survey or anthropometric measures of the de facto population by six- to twelve-month age groups, third operation survey unweighted, comparison

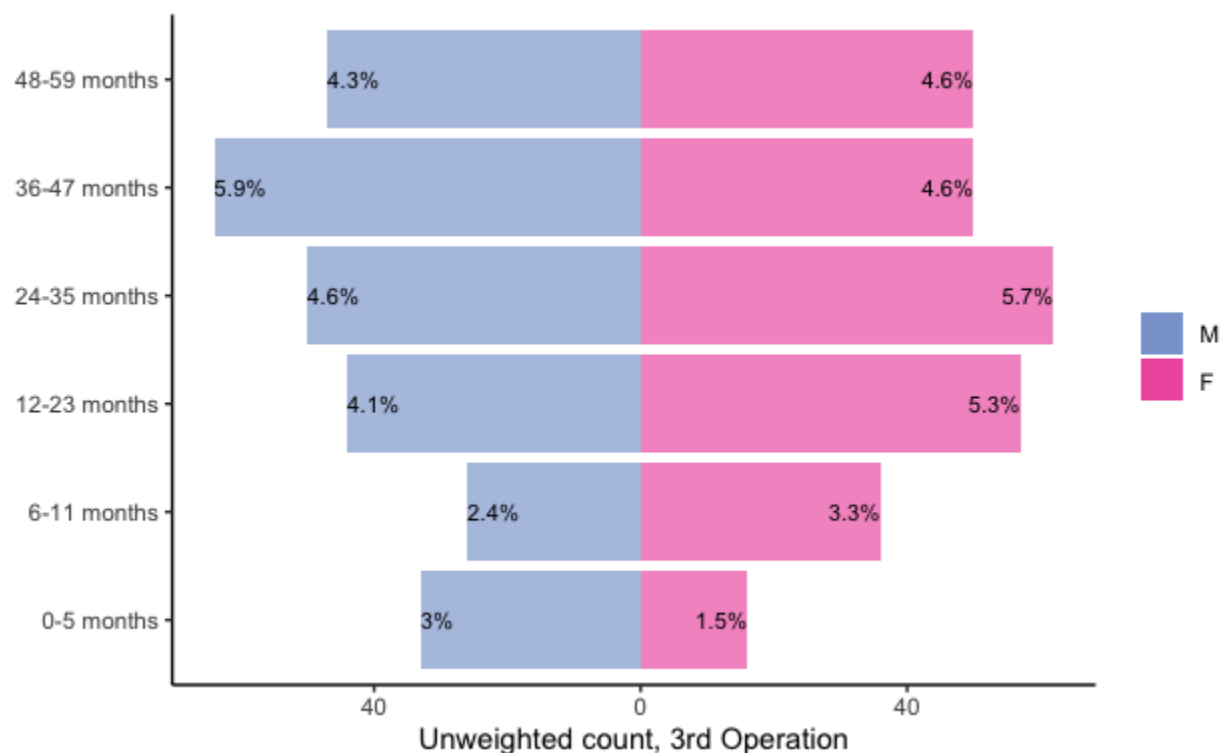


Table D.23: Diarrhea treatment with ORS and zinc (I5060), children aged 0-59 months, comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
ORS administered	104	54.3	(44.3-63.9)	77	65.5	(55.5-74.3)	60	70.2	(55.3-81.8)
Zinc administered	104	7.6	(3.9-14.4)	75	13	(6.6-24)	60	27.8	(17.5-41.1)
ORS and zinc administered to standard (0-59mo) (I5060)	104	6	(2.7-12.6)	77	9.7	(4.3-20.3)	60	23.2	(14.6-34.7)

Table D.24: Immunization against common childhood illnesses, children aged 0-59 months, according to vaccination card (I5020), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
BCG	795	78.6	(73.9-82.7)	733	75.1	(69.7-79.7)	548	82.7	(78.2-86.4)
Polio	795	73.9	(68.7-78.4)	733	70.5	(65-75.5)	548	79.9	(75-84.1)
Pentavalent	795	71	(65.7-75.8)	733	72.7	(67.2-77.5)	548	81.1	(76.1-85.3)
Pneumococcal	795	92.9	(89.5-95.2)	733	71.9	(66.5-76.8)	548	80.4	(75.3-84.7)
Rotavirus	795	67.2	(62.1-71.9)	733	70.7	(64.8-76)	548	82.3	(77.8-86.1)

	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
DPT	795	72.1	(67.9-75.9)	733	72	(66.9-76.5)	548	82.4	(76.8-86.9)
MMR	795	77.7	(73.1-81.7)	733	75.5	(70.4-79.9)	548	76.2	(70.6-81.1)
Children 0-59 months identified as having received full vaccinations for age by vaccine card (I5020)	795	56.8	(50.9-62.5)	733	60.7	(54.7-66.3)	548	66.6	(59.9-72.6)

Table D.25: Children 12-23 months of age who received MMR vaccine (MI5025), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 12-23 months who received MMR vaccine according to card (MI5025)	169	82.5	(76.1-87.5)	152	78.3	(72.2-83.3)	101	78.4	(66.6-86.8)

Table D.26: Deworming treatment among children aged 18-59 months (MI5030), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 18-59 months who received 2 doses of deworming in the last year (MI5030)	562	36.9	(33.3-40.6)	520	38.2	(32.5-44.2)	381	43.7	(39.1-48.5)

Table D.27: Exclusive breastfeeding among children aged 0-5 months (MI5040), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 0-5 months who were exclusively breastfed on the previous day (MI5040)	81	42.7	(30.9-55.3)	68	37.8	(22.9-55.4)	50	37.3	(23.9-53)

Table D.30: Prevalence of stunting in children aged 0-59 months (MI1070), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 0-5 months with height <-2 SD of the mean of the reference population	84	1.9	(0.5-7.5)	67	8.7	(3.4-20.8)	49	5.1	(1.3-17.7)
Children 6-23 months with height <-2 SD of the mean of the reference population	252	7.7	(5.5-10.5)	210	11.1	(7.2-16.8)	163	6.9	(4.4-10.6)
Children 24-59 months with height <-2 SD of the mean of the reference population	461	23.9	(18.6-30.1)	428	18.2	(12.1-26.6)	323	11.6	(7.7-17.2)
Children 0-59 months with height <-2 SD of the mean of the reference population for age (MI1070)	797	16.4	(12.8-20.7)	706	15.4	(10.9-21.2)	535	9.6	(6.8-13.5)

Table D.31: Prevalence of anemia, children aged 0-59 months (I1060/MI1050), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Children 0-5mo with hemoglobin <110g/L	15	53.3	(34.3-71.5)	23	48	(22.7-74.4)	36	57.5	(39.3-73.8)
Children 6-23mo with hemoglobin <110g/L (I1060)	243	50.2	(38.7-61.7)	192	46.8	(37.5-56.2)	153	48.7	(40.6-56.9)
Children 24-41mo with hemoglobin <110g/L	235	40.1	(30.3-50.6)	219	34.2	(25.5-44)	146	40.3	(33-48.1)
Children 42-59mo with hemoglobin <110g/L	212	31	(22.7-40.9)	184	27.9	(21-35.9)	151	28.6	(20.6-38.2)

	Baseline			2nd Operation			3rd Operation		
Children 0-59mo with hemoglobin <110g/L (MI1050)	705	41.2	(33.3-49.7)	616	36.5	(30.8-42.5)	480	40.2	(34.5-46.1)
Children 6-59mo with hemoglobin <110g/L	690	41	(32.8-49.6)	595	36.2	(30.3-42.6)	450	39.3	(33.4-45.5)

D.1.5 Indicator matrices

Table D.32: Household performance indicators, comparison areas

Indicator	Description	Time Period	N	%	CI
I1060	Children (6-23mo) with hemoglobin <110g/L	Baseline	243	50.2	(38.7 - 61.7)
		2nd Operation	192	46.8	(37.5 - 56.2)
		3rd Operation	153	48.7	(40.6 - 56.9)
I4030	Skilled postpartum care (10 days)	Baseline	413	74.1	(67.9 - 79.5)
		2nd Operation	338	89.4	(82.5 - 93.8)
		3rd Operation	238	97.6	(94.4 - 99)
I5020	Complete vaccination for age	Baseline	795	56.8	(50.9 - 62.5)
		2nd Operation	733	60.7	(54.7 - 66.3)
		3rd Operation	548	66.6	(59.9 - 72.6)
I5060	Diarrhea treatment with ORS and zinc (0-59mo)	Baseline	104	6	(2.7 - 12.6)
		2nd Operation	77	9.7	(4.3 - 20.3)
		3rd Operation	60	23.2	(14.6 - 34.7)

Table D.33: Household monitoring indicators, comparison areas

Indicator	Description	Time Period	N	%	CI
MI1050	Children (0-59mo) with hemoglobin <110g/L	Baseline	705	41.2	(33.3 - 49.7)
		2nd Operation	616	36.5	(30.8 - 42.5)
		3rd Operation	480	40.2	(34.5 - 46.1)
MI1070	Children (0-59mo) with height <-2SD of mean of reference population	Baseline	797	16.4	(12.8 - 20.7)
		2nd Operation	706	15.4	(10.9 - 21.2)
		3rd Operation	535	9.6	(6.8 - 13.5)
MI1080	Women (15-49 years) with a live birth in the last year	Baseline	1097	10.5	(8.9 - 12.4)
		2nd Operation	1045	6.2	(5 - 7.8)
		3rd Operation	754	7.5	(6.1 - 9.2)
MI1090	Women (15-19 years) with a live birth in the last year	Baseline	215	8	(5.2 - 12)
		2nd Operation	193	4.3	(2.7 - 6.8)
		3rd Operation	107	10.9	(6.9 - 16.6)
MI2010	Women using modern contraception	Baseline	599	89.1	(85.7 - 91.8)
		2nd Operation	581	83.8	(77.7 - 88.5)
		3rd Operation	454	89.2	(84.9 - 92.3)
MI2020	Women in need of but not using contraception	Baseline	599	10.9	(8.2 - 14.3)
		2nd Operation	581	16.2	(11.5 - 22.3)
		3rd Operation	454	10.8	(7.7 - 15.1)
MI2040		Baseline	702	39.6	(31.9 - 47.9)

Indicator	Description	Time Period	N	%	CI
	Women who received contraception counseling	2nd Operation	649	31.2	(25.5 - 37.6)
		3rd Operation	414	44.8	(36.5 - 53.4)
MI2030	Interruption in contraception use	Baseline	547	3.8	(1.9 - 7.3)
		2nd Operation	528	5	(1.5 - 15.5)
		3rd Operation	319	3.5	(2.1 - 5.7)
MI3010	Skilled antenatal care (1 visit)	Baseline	413	96.2	(92.6 - 98.1)
		2nd Operation	338	93.9	(89.5 - 96.6)
		3rd Operation	236	96.8	(92.9 - 98.6)
MI3020	Skilled antenatal care (4 visits)	Baseline	411	84.7	(74.8 - 91.2)
		2nd Operation	335	81.6	(75.2 - 86.7)
		3rd Operation	233	86.3	(80 - 90.8)
MI4010	Skilled in-facility delivery	Baseline	413	92.8	(87.3 - 96)
		2nd Operation	338	91.6	(81.8 - 96.4)
		3rd Operation	237	97.9	(95 - 99.1)
MI4030	Skilled postpartum care (7 days)	Baseline	413	66.3	(61.2 - 71)
		2nd Operation	335	46.8	(39.6 - 54.2)
		3rd Operation	235	63.3	(53.7 - 72)
MI4101	Skilled neonatal care (10 days)	Baseline	373	72.7	(65.6 - 78.9)
		2nd Operation	309	78.9	(72.9 - 83.8)
		3rd Operation	202	91.3	(86.9 - 94.3)
MI4110	Recognition of 5 danger signs in newborns	Baseline	318	24.9	(20.2 - 30.2)
		2nd Operation	269	28.7	(19.4 - 40.2)
		3rd Operation	169	11	(5.7 - 20.3)
MI4120	Use of maternal waiting home	Baseline	413	14.5	(8.6 - 23.5)
		2nd Operation	338	20.9	(13.9 - 30.1)
		3rd Operation	238	38.7	(24.9 - 54.7)
MI5025	Children (12-23mo) who received MMR vaccine	Baseline	169	82.5	(76.1 - 87.5)
		2nd Operation	152	78.3	(72.2 - 83.3)
		3rd Operation	101	78.4	(66.6 - 86.8)
MI5030	Children (18-59mo) who received 2 doses of deworming	Baseline	562	36.9	(33.3 - 40.6)
		2nd Operation	520	38.2	(32.5 - 44.2)
		3rd Operation	381	43.7	(39.1 - 48.5)
MI5040	Exclusive breastfeeding (0-5mo)	Baseline	81	42.7	(30.9 - 55.3)
		2nd Operation	68	37.8	(22.9 - 55.4)
		3rd Operation	50	37.3	(23.9 - 53)
MI5050	Early initiation of breastfeeding	Baseline	425	79.6	(74.2 - 84.1)
		2nd Operation	342	76.4	(68 - 83.1)
		3rd Operation	241	66.1	(58.1 - 73.2)

D.2 Comparison area health facility survey results

D.2.1 Summary of health facilities and medical record extraction

Table D.34: Health facility classification, comparison areas

EONC	Baseline	2nd Operation	3rd Operation
Ambulatory	23	19	10
Basic	1	8	8
Complete	0	3	3
Total	24	30	21

Figure D.11: Map of health facilities in third operation comparison areas



Table D.35: Facilities by health region and municipality, comparison areas

Health Region	Municipality	Baseline	2nd Operation	3rd Operation
Chontales	El Ayote	1	2	1
Chontales	Juigalpa	0	1	1
Jinotega	Jinotega	16	11	10
Madriz	San Juan Río Coco	5	6	2
Madriz	Somoto	0	1	1
Madriz	Telpaneca	2	4	1
Nueva Segovia	Jalapa	0	1	1
Nueva Segovia	Ocotol	0	1	1
Nueva Segovia	Quilali	0	1	1
Zelaya Central	El Rama	0	1	1
Zelaya Central	Muelle de los Bueyes	0	1	1
Total		24	30	21

Table D.36: Medical Record Review sample size, comparison areas

MRR Type	Baseline	2nd Operation	3rd Operation, Pre-Evaluation	3rd Operation, Evaluation
Antenatal care	247	203	61	105
Cervical cancer screening	0	0	0	84
Immediate postpartum care	12	126	59	101
Neonatal complications	113	149	51	86
Obstetric complications	103	155	45	84
Uncomplicated delivery	12	131	54	89
Total	487	764	270	549

D.2.2 Child health and vaccination

Table D.37: Cold chain (MI7000), comparison, ambulatory and basic facilities

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
At least one functional refrigerator	19	89.5	(62.9-97.7)	18	100	(-)	12	100	(-)
Temperature monitoring chart for each fridge	19	73.7	(47.6-89.6)	18	94.4	(64.5-99.4)	12	91.7	(49.9-99.2)
Temperature recorded twice daily during past 30 days	19	42.1	(21.1-66.5)	18	72.2	(45.3-89.1)	12	91.7	(49.9-99.2)
Cold chain according to standard (MI7000)	19	42.1	(21.1-66.5)	18	72.2	(45.3-89.1)	12	91.7	(49.9-99.2)

Table D.38: Child care services (MI7010), comparison, ambulatory facilities

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
All childcare equipment observed and functional	21	61.9	(38.3-80.9)	18	77.8	(50.5-92.3)	10	90	(42.2-99.1)
Pediatric scales	21	90.5	(66-97.9)	18	83.3	(55.9-95.2)	10	90	(42.2-99.1)
Height rod	21	95.2	(69.1-99.4)	18	100	(-)	10	100	(-)
Stethoscope	21	81	(56.4-93.3)	18	100	(-)	10	100	(-)
Thermometer	21	76.2	(51.7-90.5)	18	100	(-)	10	100	(-)
Growth / Development card	21	90.5	(66-97.9)	18	88.9	(61.1-97.6)	10	90	(42.2-99.1)
All drugs observed on day of observation	21	95.2	(69.1-99.4)	18	66.7	(40.3-85.6)	10	100	(-)
Oral rehydration salts	21	95.2	(69.1-99.4)	18	72.2	(45.3-89.1)	10	100	(-)
Ferrous sulfate / zinc sulfate / zinc gluconate	21	100	(-)	18	88.9	(61.1-97.6)	10	100	(-)
Albendazole / mebendazole	21	100	(-)	18	94.4	(64.5-99.4)	10	100	(-)

	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
All drugs continuously available in past three months	21	85.7	(61.3-95.8)	18	55.6	(30.9-77.8)	10	100	(-)
Facility stores vaccines	21	81	(56.4-93.3)	18	66.7	(40.3-85.6)	10	70	(31-92.4)
All vaccines observed on day of survey	17	35.3	(15.2-62.3)	12	75	(39.3-93.3)	7	85.7	(25.7-99)
Pentavalent / (DPT + Hep B + HiB)	17	94.1	(62.7-99.3)	12	91.7	(49.9-99.2)	7	100	(-)
Polio	17	82.4	(53.7-94.9)	12	100	(-)	7	100	(-)
Measles, Mumps, Rubella	17	88.2	(59.1-97.5)	12	100	(-)	7	100	(-)
Rotavirus	17	94.1	(62.7-99.3)	12	91.7	(49.9-99.2)	7	100	(-)
Pneumococcal conjugate	17	76.5	(48.2-91.9)	12	91.7	(49.9-99.2)	7	100	(-)
BCG	17	41.2	(19.3-67.3)	12	91.7	(49.9-99.2)	7	85.7	(25.7-99)
All vaccines continuously available in past three months	17	35.3	(15.2-62.3)	12	66.7	(32.9-89.1)	7	57.1	(15-90.9)
Child health supplies according to standard (MI7010)	21	28.6	(12.5-52.9)	18	38.9	(18.2-64.5)	10	60	(24.3-87.5)

Equipment data missing from four facilities at first operation.

Pharmacy data missing from four facilities at first operation.

Digital thermometer only captured as alternative to oral/axillary thermometers at second operation evaluation.

Ferrous sulfate three-month stock not captured at baseline.

Vaccine three-month stock only captured for MMR and BCG at baseline and first operation.

DPT + HepB + Hib not captured as Pentavalent alternatives at baseline and first operation.

Kardex data and three month-stock data not captured for all drugs at baseline evaluation.

Table D.39: Child care services (MI7010), comparison, basic facilities

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
All childcare equipment observed and functional	1	0	(-)	8	37.5	(8.7-79.2)	8	62.5	(20.8-91.3)
Pediatric scales	1	100	(-)	8	100	(-)	8	100	(-)
Height rod	1	0	(-)	8	87.5	(31.9-99.1)	8	100	(-)
Stethoscope	1	100	(-)	8	87.5	(31.9-99.1)	8	75	(27.6-95.9)
Pediatric stethoscope	1	0	(-)	8	62.5	(20.8-91.3)	8	75	(27.6-95.9)
Thermometer	1	0	(-)	8	100	(-)	8	100	(-)
Growth / Development card	1	0	(-)	8	50	(14.3-85.7)	8	100	(-)
All drugs observed on day of observation	1	100	(-)	8	87.5	(31.9-99.1)	8	100	(-)
Oral rehydration salts	1	100	(-)	8	87.5	(31.9-99.1)	8	100	(-)
Ferrous sulfate / zinc sulfate / zinc gluconate	1	100	(-)	8	100	(-)	8	100	(-)
Albendazole / mebendazole	1	100	(-)	8	100	(-)	8	100	(-)
Erythromycin / amoxicillin / penicillin benzathine	1	100	(-)	8	100	(-)	8	100	(-)

	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
All drugs continuously available in past three months	1	100	(-)	8	62.5	(20.8-91.3)	8	87.5	(31.9-99.1)
Facility stores vaccines	1	100	(-)	8	87.5	(31.9-99.1)	8	75	(27.6-95.9)
All vaccines observed on day of survey	1	0	(-)	7	71.4	(21.5-95.8)	6	100	(-)
Pentavalent / (DPT + Hep B + HiB)	1	100	(-)	7	100	(-)	6	100	(-)
Polio	1	100	(-)	7	100	(-)	6	100	(-)
Measles, Mumps, Rubella	1	100	(-)	7	100	(-)	6	100	(-)
Rotavirus	1	100	(-)	7	100	(-)	6	100	(-)
Pneumococcal conjugate	1	0	(-)	7	85.7	(25.7-99)	6	100	(-)
BCG	1	0	(-)	7	85.7	(25.7-99)	6	100	(-)
All vaccines continuously available in past three months	1	0	(-)	7	71.4	(21.5-95.8)	6	83.3	(18.6-99.1)
Child health supplies according to standard (MI7010)	1	0	(-)	8	12.5	(0.9-68.1)	8	50	(14.3-85.7)

Digital thermometer only captured as alternative to oral/axillary thermometers at second operation evaluation.

Ferrous sulfate three-month stock not captured at baseline.

Vaccine three-month stock only captured for MMR and BCG at baseline and first operation.

DPT + HepB + Hib not captured as Pentavalent alternatives at baseline and first operation.

Kardex data and three month-stock data not captured for all drugs at baseline evaluation.

D.2.3 Women's health

Table D.40: First ANC within 12 weeks (I3040), comparison, ambulatory facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
First ANC visit within 12 weeks (I3040)	73	38.4	(27.7-50.2)	178	55.6	(48.2-62.8)	55	69.1	(55.3-80.1)	97	71.1	(61.2-79.4)

Table D.41: At least four antenatal care (ANC) visits to standard (MI3030), comparison, ambulatory and basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
At least four ANC visits	79	60.8	(49.4-71.1)	203	57.1	(50.2-63.8)	61	77	(64.5-86.1)	105	77.1	(68-84.3)
All appropriate checks performed, at least four ANC visits	79	60.8	(49.4-71.1)	203	49.8	(42.9-56.7)	61	73.8	(61-83.5)	105	71.4	(61.9-79.4)
All lab tests performed at least once during pregnancy:	79	39.2	(28.9-50.6)	203	35	(28.7-41.8)	61	57.4	(44.4-69.4)	105	67.6	(58-76)
Blood group	79	87.3	(77.8-93.1)	203	64.5	(57.7-70.9)	61	83.6	(71.7-91.1)	105	84.8	(76.4-90.5)
Rh factor	79	84.8	(74.9-91.3)	203	64.5	(57.7-70.9)	61	83.6	(71.7-91.1)	105	86.7	(78.6-92)
Blood glucose	79	59.5	(48.1-69.9)	203	57.1	(50.2-63.8)	61	85.2	(73.6-92.3)	105	84.8	(76.4-90.5)
HIV test	0			203	71.4	(64.8-77.3)	61	73.8	(61-83.5)	105	87.6	(79.7-92.7)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Syphilis test (VDRL / RPR*)	79	83.5	(73.4-90.3)	203	57.1	(50.2-63.8)	61	80.3	(68.1-88.7)	105	79	(70.1-85.9)
Hemoglobin	79	65.8	(54.5-75.6)	203	56.7	(49.7-63.4)	61	60.7	(47.6-72.3)	105	70.5	(60.9-78.5)
Urinalysis	79	89.9	(80.8-94.9)	203	61.1	(54.1-67.6)	61	90.2	(79.4-95.6)	105	82.9	(74.3-89)
Antenatal care performed according to standard (MI3030)	79	21.5	(13.7-32.2)	203	20.2	(15.2-26.3)	61	50.8	(38.1-63.4)	105	53.3	(43.6-62.8)

Table D.42: Pre/postnatal care services (MI7020), comparison, ambulatory facilities

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
All antenatal/postpartum equipment observed and functional	22	18.2	(6.4-41.9)	19	68.4	(42.7-86.3)	10	40	(12.5-75.7)
Standing scale with height rod	22	77.3	(53.5-90.9)	19	100	(-)	10	100	(-)
Gynecological table	22	90.9	(67.3-98)	19	94.7	(66.2-99.4)	10	100	(-)
Lamp	22	36.4	(18.2-59.5)	19	78.9	(52.7-92.7)	10	70	(31-92.4)
CLAP / measuring tape	22	90.9	(67.3-98)	19	100	(-)	10	100	(-)
Sphygmomanometer	22	77.3	(53.5-90.9)	19	94.7	(66.2-99.4)	10	100	(-)
Stethoscope	22	81.8	(58.1-93.6)	19	100	(-)	10	100	(-)
Pregnancy wheel	22	95.5	(70.4-99.5)	19	89.5	(62.9-97.7)	10	70	(31-92.4)
Antenatal/postpartum care supplies according to standard (MI7020)	22	18.2	(6.4-41.9)	19	68.4	(42.7-86.3)	10	40	(12.5-75.7)

Table D.43: Pre/postnatal care services (MI7020), comparison, basic facilities

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
All antenatal/postpartum equipment observed and functional	1	0	(-)	7	42.9	(9.1-85)	8	62.5	(20.8-91.3)
Standing scale with height rod	1	0	(-)	7	71.4	(21.5-95.8)	8	87.5	(31.9-99.1)
Gynecological table	1	100	(-)	7	100	(-)	8	87.5	(31.9-99.1)
Lamp	1	100	(-)	7	100	(-)	8	75	(27.6-95.9)
CLAP / measuring tape	1	0	(-)	7	100	(-)	8	87.5	(31.9-99.1)
Sphygmomanometer	1	100	(-)	7	71.4	(21.5-95.8)	8	87.5	(31.9-99.1)
Stethoscope	1	100	(-)	7	85.7	(25.7-99)	8	75	(27.6-95.9)
Pregnancy wheel	1	0	(-)	7	71.4	(21.5-95.8)	8	100	(-)
Intrauterine device kit	1	100	(-)	7	85.7	(25.7-99)	8	100	(-)

	Baseline			2nd Operation			3rd Operation		
All lab inputs observed	1	0	(-)	7	57.1	(15-90.9)	8	87.5	(31.9-99.1)
Rapid HIV test	1	0	(-)	7	100	(-)	8	100	(-)
Rapid syphilis test	1	100	(-)	7	71.4	(21.5-95.8)	8	100	(-)
Serological mixer	0			7	71.4	(21.5-95.8)	8	100	(-)
Urine analysis	0			7	85.7	(25.7-99)	8	100	(-)
Glucose test	1	100	(-)	7	85.7	(25.7-99)	8	87.5	(31.9-99.1)
Blood test equipment	0			7	100	(-)	8	100	(-)
Microscope	0			7	100	(-)	8	100	(-)
Automated cell counter	1	0	(-)	7	100	(-)	8	100	(-)
Antenatal/postpartum care supplies according to standard (MI7020)	1	0	(-)	7	14.3	(1-74.3)	8	62.5	(20.8-91.3)

Serological mixer, urine analysis, blood analysis equipment, and microscope not captured at baseline.

Table D.44: Cervical cancer screening with quality (I6005), comparison, ambulatory facilities

Description	3rd Operation: Evaluation		
	N	%	CI
Evidence of any HPV screening?	82	1.2	(0.2-8.5)
HPV screening date recorded	1	100	(-)
Most recent HPV screening within 5 years	1	100	(-)
Negative HPV result in past 5 years	1	0	(-)
Most recent HPV screening within past year	1	0	(-)
Positive HPV result in past year	0		
Date of positive HPV result notification recorded	0		
Notification of positive HPV result within 30 days of lab result	0		
Evidence notification was received	0		
All requirements for positive HPV result in past year met	0		
HPV result not recorded	1	100	(-)
HPV screening to standard (positive or negative)	1	0	(-)
Evidence of any VIAA screening?	82	3.7	(1.2-11)
VIAA screening date recorded	3	100	(-)
Most recent VIAA screening within 3 years	3	66.7	(0.3-99.9)
Negative VIAA result in past 3 years	2	50	(0-100)
Most recent VIAA screening within past year	3	33.3	(0.1-99.7)
Positive VIAA result in past year	1	0	(-)
Date of positive VIAA result notification recorded	0		
Notification of positive VIAA result within 30 days of screening	0		
Evidence notification was received	0		
All requirements for positive VIAA result in past year met	0		
VIAA result not recorded	3	0	(-)
VIAA screening to standard (positive or negative)	3	33.3	(0.1-99.7)
Evidence of any PAP screening?	82	91.5	(82.9-95.9)

	3rd Operation: Evaluation		
PAP screening date recorded	75	100	(-)
Most recent PAP screening within 4 years	75	94.7	(86.4-98)
Negative PAP result (most recent) in past 4 years	71	77.5	(66-85.9)
At least three PAP screenings registered, if most recent negative result > 1 year ago	14	21.4	(6-54)
All requirements for negative PAP result in past four years met	55	80	(66.9-88.8)
Most recent PAP screening within past year	75	73.3	(62-82.3)
Positive PAP result in past year	55	12.7	(6-24.8)
Date of positive PAP result notification recorded	7	42.9	(9.1-85)
Notification of positive PAP result within 30 days of lab result	7	42.9	(9.1-85)
Evidence notification was received	7	28.6	(4.2-78.5)
All requirements for positive PAP result in past year met	7	28.6	(4.2-78.5)
PAP result not recorded	75	12	(6.3-21.8)
PAP screening to standard (positive or negative)	75	61.3	(49.6-71.8)
No evidence of screening in record	82	8.5	(4.1-17.1)
Cervical cancer screening with quality (I6005)	82	57.3	(46.2-67.7)

Table D.45: Contraceptive services (MI7050), comparison, ambulatory facilities

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
All methods observed day of survey	22	86.4	(62.8-96)	19	89.5	(62.9-97.7)	9	88.9	(37.4-99.1)
Male condom	22	86.4	(62.8-96)	19	100	(-)	9	88.9	(37.4-99.1)
Oral contraceptive pill	22	100	(-)	19	94.7	(66.2-99.4)	9	100	(-)
Injectable	22	100	(-)	19	89.5	(62.9-97.7)	9	100	(-)
All methods continuously available in past three months	22	68.2	(44.7-85)	19	73.7	(47.6-89.6)	9	77.8	(33-96.1)
Contraceptive services according to standard (MI7050)	22	68.2	(44.7-85)	19	73.7	(47.6-89.6)	9	77.8	(33-96.1)

Table D.46: Contraceptive services (MI7050), comparison, basic facilities

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
All methods observed day of survey	1	100	(-)	5	100	(-)	6	83.3	(18.6-99.1)
Male condom	1	100	(-)	5	100	(-)	6	100	(-)
Oral contraceptive pill	1	100	(-)	5	100	(-)	6	100	(-)
Injectable	1	100	(-)	5	100	(-)	6	100	(-)
Intrauterine device	1	100	(-)	5	100	(-)	6	83.3	(18.6-99.1)
All methods continuously available in past three months	1	100	(-)	5	60	(8.1-96.2)	6	66.7	(14.9-95.8)
Contraceptive services according to standard (MI7050)	1	100	(-)	5	60	(8.1-96.2)	6	66.7	(14.9-95.8)

IUD three-month stock not captured at baseline.

IUD kardex not captured at first follow-up.

D.2.4 Obstetric care

Table D.47: Partograph completion for uncomplicated deliveries (MI4065), comparison, basic and complete facilities

Description	2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI
Imminent birth or elective C-section	131	80.2	(72.3-86.2)	51	45.1	(31.7-59.2)	87	40.2	(30.3-51)
Partograph included and filled out	131	85.5	(78.3-90.6)	51	62.7	(48.3-75.2)	87	58.6	(47.8-68.6)
Dilation > 4.5cm	112	54.5	(45.1-63.6)	32	25	(12.5-43.7)	51	11.8	(5.2-24.4)
Fetal heart rate and alert curve recorded if dilation > 4.5cm	61	96.7	(87.4-99.2)	8	100	(-)	6	100	(-)
Alert curve surpassed	112	17	(11-25.2)	32	6.3	(1.4-23.2)	51	9.8	(4-22)
Note exists within 30 minutes if alert curve surpassed	19	94.7	(66.2-99.4)	2	100	(-)	5	60	(8.1-96.2)
Fetal heart rate < 120 bpm	112	0.9	(0.1-6.2)	32	0	(-)	51	0	(-)
Note exists within 30 minutes if fetal heart rate < 120 bpm	1	0	(-)	0			0		
Partograph revised according to standard (MI4065)	131	96.2	(91.1-98.4)	51	84.3	(71.1-92.1)	87	73.6	(63.1-81.9)

Table D.48: Active management of the third stage of labor (MI4095), comparison, basic and complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Oxytocin administered	12	91.7	(49.9-99.2)	131	97.7	(93-99.3)	51	94.1	(82.7-98.2)	87	94.3	(86.7-97.6)
Other uterotonic administered	12	0	(-)	131	0	(-)	51	3.9	(0.9-15)	87	1.1	(0.2-8)
Active management of third stage of labor according to standard (MI4095)	12	91.7	(49.9-99.2)	131	89.3	(82.7-93.6)	51	86.3	(73.4-93.5)	87	83.9	(74.4-90.3)

Table D.49: Sociocultural conditions (MI8870), comparison, Centros de Salud

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Services adapt to sociocultural conditions (MI8870)	3	33.3	(0.1-99.7)	3	66.7	(0.3-99.9)	3	33.3	(0.1-99.7)

Table D.50: Maternal postpartum care within two hours after birth (MI4050), comparison, basic and complete facilities

Description	2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI
Blood pressure checked at least four times	117	95.7	(90-98.2)	32	90.6	(73.3-97.1)	60	93.3	(83.1-97.5)
Temperature checked at least four times	117	95.7	(90-98.2)	32	90.6	(73.3-97.1)	60	93.3	(83.1-97.5)
Heart rate / pulse checked at least four times	117	93.2	(86.8-96.6)	32	90.6	(73.3-97.1)	60	93.3	(83.1-97.5)
All checks at discharge	117	88.9	(81.7-93.5)	32	84.4	(66.3-93.7)	60	81.7	(69.4-89.7)
Immediate postpartum care to standard (MI4050)	117	85.5	(77.7-90.8)	32	78.1	(59.6-89.7)	60	76.7	(64-85.9)

Table D.51: Management of obstetric complications (I4080), comparison

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Sepsis managed to standard	12	75	(39.3-93.3)	15	86.7	(54.6-97.2)	5	80	(11.1-99.2)	7	57.1	(15-90.9)
Hemorrhage managed to standard	22	27.3	(11.9-51)	31	32.3	(17.7-51.4)	21	33.3	(15.7-57.4)	33	30.3	(16.6-48.8)
Pre-eclampsia managed to standard	37	5.4	(1.3-20.3)	79	10.1	(5.1-19.2)	18	0	(-)	44	4.5	(1.1-17.2)
Eclampsia managed to standard	4	0	(-)	3	66.7	(0.3-99.9)	3	0	(-)	5	20	(0.8-88.9)
Management of obstetric complications (I4080)	75	22.7	(14.4-33.8)	127	25.2	(18.3-33.6)	45	24.4	(13.8-39.6)	84	19	(11.9-29.1)

Table D.52: Management of obstetric complications (I4080), sepsis, comparison, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked:	9	100	(-)	11	100	(-)	5	100	(-)	6	83.3	(18.6-99.1)
Pulse / heart rate	9	100	(-)	11	100	(-)	5	100	(-)	6	100	(-)
Blood pressure	9	100	(-)	11	100	(-)	5	100	(-)	6	83.3	(18.6-99.1)
Temperature	9	100	(-)	11	100	(-)	5	100	(-)	6	100	(-)
Antibiotics administered	9	100	(-)	11	100	(-)	5	100	(-)	6	83.3	(18.6-99.1)
Causes treated appropriately:	3	66.7	(0.3-99.9)	3	100	(-)	1	0	(-)	0		
Pelvic abscess	1	0	(-)	0			0			0		
Retained product	1	0	(-)	2	100	(-)	1	0	(-)	0		
Postpartum endometritis	3	100	(-)	1	100	(-)	0			0		

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Obstetric sepsis managed to standard	9	88.9	(37.4-99.1)	11	100	(-)	5	80	(11.1-99.2)	6	66.7	(14.9-95.8)

Table D.53: Management of obstetric complications (I4080), sepsis, comparison, complete facilities

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Description	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked:	3	100	(-)	4	100	(-)	0			1	100	(-)
Pulse / heart rate	3	100	(-)	4	100	(-)	0			1	100	(-)
Blood pressure	3	100	(-)	4	100	(-)	0			1	100	(-)
Temperature	3	100	(-)	4	100	(-)	0			1	100	(-)
Lab tests (blood biometry):	3	33.3	(0.1-99.7)	4	75	(4.1-99.5)	0			1	0	(-)
Leukocyte count	3	66.7	(0.3-99.9)	4	100	(-)	0			1	100	(-)
Platelet count	3	33.3	(0.1-99.7)	4	100	(-)	0			1	100	(-)
Hemoglobin	3	33.3	(0.1-99.7)	4	75	(4.1-99.5)	0			1	0	(-)
Hematocrit	3	66.7	(0.3-99.9)	4	100	(-)	0			1	100	(-)
Antibiotics administered	3	100	(-)	4	100	(-)	0			1	100	(-)
Causes treated appropriately:	3	100	(-)	3	66.7	(0.3-99.9)	0			1	0	(-)
Pelvic abscess	0			0			0			0		
Retained product	3	100	(-)	2	50	(0-100)	0			1	0	(-)
Postpartum endometritis	0			1	100	(-)	0			1	100	(-)
Obstetric sepsis managed to standard	3	33.3	(0.1-99.7)	4	50	(2.5-97.5)	0			1	0	(-)

No applicable records reviewed in the third operation pre-evaluation measurement.

Table D.54: Management of obstetric complications (I4080), hemorrhage, comparison, basic facilities

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Description	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked:	7	100	(-)	15	80	(48.8-94.4)	11	100	(-)	15	93.3	(58.4-99.3)
Pulse / heart rate	7	100	(-)	15	80	(48.8-94.4)	11	100	(-)	15	93.3	(58.4-99.3)
Blood pressure	7	100	(-)	15	93.3	(58.4-99.3)	11	100	(-)	15	93.3	(58.4-99.3)
Ringer's lactate / Hartmann's / saline solution administered	7	85.7	(25.7-99)	15	73.3	(42.9-91)	11	54.5	(22.6-83.2)	15	60	(31.8-82.9)
Causes treated appropriately:	3	66.7	(0.3-99.9)	9	77.8	(33-96.1)	6	66.7	(14.9-95.8)	8	50	(14.3-85.7)
Abortion	0			1	100	(-)	0			0		
Ectopic pregnancy	0			0			0			0		

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Placenta previa	2	50	(0-100)	3	33.3	(0.1-99.7)	2	100	(-)	2	50	(0-100)
Placental abruption	0			0			0			0		
Uterine rupture	0			0			0			1	100	(-)
Uterine atony	1	100	(-)	0			4	50	(2.5-97.5)	6	50	(9.1-90.9)
Uterine inversion	0			0			0			0		
Retained product	0			5	100	(-)	0			1	0	(-)
Hemorrhage managed to standard	7	85.7	(25.7-99)	15	60	(31.8-82.9)	11	45.5	(16.8-77.4)	15	53.3	(26.6-78.3)

Table D.55: Management of obstetric complications (I4080), hemorrhage, comparison, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked:	15	100	(-)	16	81.2	(51.4-94.7)	10	100	(-)	18	100	(-)
Pulse / heart rate	15	100	(-)	16	93.7	(60.7-99.3)	10	100	(-)	18	100	(-)
Blood pressure	15	100	(-)	16	87.5	(57-97.4)	10	100	(-)	18	100	(-)
Ringer's lactate / Hartmann's / saline solution administered	15	86.7	(54.6-97.2)	16	81.2	(51.4-94.7)	10	100	(-)	18	77.8	(50.5-92.3)
Lab tests:	15	0	(-)	16	18.8	(5.3-48.6)	10	20	(3.7-62.2)	18	16.7	(4.8-44.1)
Hematocrit	15	66.7	(37.2-87.1)	16	81.2	(51.4-94.7)	10	100	(-)	18	100	(-)
Hemoglobin	15	0	(-)	16	18.8	(5.3-48.6)	10	20	(3.7-62.2)	18	16.7	(4.8-44.1)
Platelet count	15	60	(31.8-82.9)	16	68.7	(40.2-87.8)	10	100	(-)	18	100	(-)
Causes treated appropriately:	7	85.7	(25.7-99)	12	83.3	(45.7-96.7)	7	85.7	(25.7-99)	15	80	(48.8-94.4)
Abortion	0			0			0			0		
Ectopic pregnancy	0			0			0			0		
Placenta previa	1	100	(-)	2	100	(-)	1	100	(-)	2	100	(-)
Placental abruption	0			0			1	100	(-)	0		
Uterine rupture	0			1	100	(-)	0			0		
Uterine atony	1	100	(-)	3	66.7	(0.3-99.9)	5	80	(11.1-99.2)	13	76.9	(42.8-93.7)
Uterine inversion	0			0			0			0		
Retained product	5	80	(11.1-99.2)	6	83.3	(18.6-99.1)	0			3	100	(-)
Hemorrhage managed to standard	15	0	(-)	16	6.3	(0.7-39.3)	10	20	(3.7-62.2)	18	11.1	(2.4-38.9)

Table D.56: Management of obstetric complications (I4080), pre-eclampsia, comparison, basic facilities, referred

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	4	100	(-)	12	100	(-)	2	100	(-)	9	100	(-)
Pulse / heart rate	4	100	(-)	12	100	(-)	2	100	(-)	9	100	(-)
Blood pressure	4	100	(-)	12	100	(-)	2	100	(-)	9	100	(-)
Respiratory rate	4	100	(-)	12	100	(-)	2	100	(-)	9	100	(-)
Urine protein	4	50	(2.5-97.5)	12	91.7	(49.9-99.2)	2	50	(0-100)	9	77.8	(33-96.1)
All appropriate medications administered	4	100	(-)	12	58.3	(26.7-84.3)	2	50	(0-100)	9	11.1	(0.9-62.6)
Magnesium sulfate	4	100	(-)	12	58.3	(26.7-84.3)	2	50	(0-100)	9	11.1	(0.9-62.6)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	2	100	(-)	4	100	(-)	0			2	100	(-)
Pre-eclampsia managed to standard	4	50	(2.5-97.5)	12	58.3	(26.7-84.3)	2	0	(-)	9	11.1	(0.9-62.6)

Table D.57: Management of obstetric complications (I4080), pre-eclampsia, comparison, basic facilities, not referred

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	5	100	(-)	34	94.1	(78-98.6)	3	100	(-)	8	100	(-)
Pulse / heart rate	5	100	(-)	34	94.1	(78-98.6)	3	100	(-)	8	100	(-)
Blood pressure	5	100	(-)	34	97.1	(80.2-99.6)	3	100	(-)	8	100	(-)
Respiratory rate	5	100	(-)	34	94.1	(78-98.6)	3	100	(-)	8	100	(-)
Lab tests	5	0	(-)	34	0	(-)	3	0	(-)	8	0	(-)
Urine protein	5	60	(8.1-96.2)	34	58.8	(41-74.6)	3	66.7	(0.3-99.9)	8	50	(14.3-85.7)
Platelet count	5	20	(0.8-88.9)	34	79.4	(61.6-90.3)	3	66.7	(0.3-99.9)	8	62.5	(20.8-91.3)
Creatine	5	20	(0.8-88.9)	34	52.9	(35.6-69.6)	3	100	(-)	8	62.5	(20.8-91.3)
Uric acid	5	20	(0.8-88.9)	34	50	(33-67)	3	100	(-)	8	50	(14.3-85.7)
Aspartate aminotransferase / glutamic-oxalacetic transaminase	5	0	(-)	34	41.2	(25.4-59)	3	100	(-)	8	75	(27.6-95.9)
Alanine transaminase / glutamic-pyruvic transaminase	5	0	(-)	34	38.2	(23-56.2)	3	100	(-)	8	75	(27.6-95.9)
Lactate dehydrogenase	5	0	(-)	34	0	(-)	3	0	(-)	8	12.5	(0.9-68.1)
All appropriate medications administered	5	0	(-)	34	32.4	(18.3-50.5)	3	33.3	(0.1-99.7)	8	12.5	(0.9-68.1)
Magnesium sulfate	5	0	(-)	34	32.4	(18.3-50.5)	3	33.3	(0.1-99.7)	8	12.5	(0.9-68.1)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	1	0	(-)	8	100	(-)	0			0		
Pre-eclampsia managed to standard (I4080)	5	0	(-)	34	0	(-)	3	0	(-)	8	0	(-)

Table D.58: Management of obstetric complications (I4080), pre-eclampsia, comparison, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	26	57.7	(37.2-75.8)	32	53.1	(35.2-70.2)	13	76.9	(42.8-93.7)	27	29.6	(14.8-50.4)
Pulse / heart rate	26	100	(-)	32	100	(-)	13	100	(-)	27	100	(-)
Blood pressure	26	96.2	(74.6-99.5)	32	100	(-)	13	100	(-)	27	100	(-)
Respiratory rate	26	100	(-)	32	100	(-)	13	100	(-)	27	100	(-)
Patellar reflex	26	57.7	(37.2-75.8)	32	53.1	(35.2-70.2)	13	76.9	(42.8-93.7)	27	29.6	(14.8-50.4)
Lab tests	26	0	(-)	32	6.3	(1.4-23.2)	13	7.7	(0.8-46.9)	27	7.4	(1.7-27.2)
Urine protein	26	46.2	(27.3-66.2)	32	62.5	(43.9-78)	13	69.2	(36.5-89.8)	27	37	(20.3-57.5)
Platelet count	26	57.7	(37.2-75.8)	32	78.1	(59.6-89.7)	13	92.3	(53.1-99.2)	27	92.6	(72.8-98.3)
Creatine	26	76.9	(55.6-89.9)	32	68.7	(50-82.9)	13	84.6	(49-96.9)	27	92.6	(72.8-98.3)
Uric acid	26	30.8	(15.4-52)	32	46.9	(29.8-64.8)	13	69.2	(36.5-89.8)	27	74.1	(53.2-87.8)
Aspartate aminotransferase / glutamic-oxalacetic transaminase	26	53.8	(33.8-72.7)	32	78.1	(59.6-89.7)	13	100	(-)	27	85.2	(64.9-94.7)
Alanine transaminase / glutamic-pyruvic transaminase	26	57.7	(37.2-75.8)	32	78.1	(59.6-89.7)	13	100	(-)	27	85.2	(64.9-94.7)
Lactate dehydrogenase	26	0	(-)	32	12.5	(4.5-30.2)	13	30.8	(10.2-63.5)	27	66.7	(46-82.5)
All appropriate medications administered	26	30.8	(15.4-52)	32	68.7	(50-82.9)	13	76.9	(42.8-93.7)	27	96.3	(75.5-99.5)
Magnesium sulfate	26	34.6	(18.2-55.7)	32	68.7	(50-82.9)	13	76.9	(42.8-93.7)	27	100	(-)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	5	60	(8.1-96.2)	9	100	(-)	0			11	90.9	(46.3-99.1)
Pre-eclampsia managed to standard (I4080)	26	0	(-)	32	3.1	(0.4-20.9)	13	0	(-)	27	3.7	(0.5-24.5)

Table D.59: Management of obstetric complications (I4080), eclampsia, comparison, basic facilities, referred

Description	2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	2	100	(-)	1	100	(-)	1	100	(-)
Pulse / heart rate	2	100	(-)	1	100	(-)	1	100	(-)
Blood pressure	2	100	(-)	1	100	(-)	1	100	(-)
Respiratory rate	2	100	(-)	1	100	(-)	1	100	(-)
Urine protein	2	100	(-)	1	0	(-)	1	100	(-)
All appropriate medications administered	2	100	(-)	1	0	(-)	1	100	(-)
Magnesium sulfate	2	100	(-)	1	0	(-)	1	100	(-)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	1	100	(-)	1	0	(-)	0		
Eclampsia managed according to SMI standard (I4080)	2	100	(-)	1	0	(-)	1	100	(-)

Table D.60: Management of obstetric complications (I4080), eclampsia, comparison, basic facilities, not referred

Description	Baseline			3rd Operation: Evaluation		
	N	%	CI	N	%	CI
Vital signs checked	1	100	(-)	1	0	(-)
Pulse / heart rate	1	100	(-)	1	0	(-)
Blood pressure	1	100	(-)	1	0	(-)
Respiratory rate	1	100	(-)	1	0	(-)
Lab tests	1	0	(-)	1	0	(-)
Urine protein	1	100	(-)	1	0	(-)
Platelet count	1	0	(-)	1	0	(-)
Creatine	1	100	(-)	1	0	(-)
Uric acid	1	0	(-)	1	0	(-)
Aspartate aminotransferase / glutamic-oxalacetic transaminase	1	100	(-)	1	0	(-)
Alanine transaminase / glutamic-pyruvic transaminase	1	100	(-)	1	0	(-)
Lactate dehydrogenase	1	0	(-)	1	0	(-)
All appropriate medications administered	1	100	(-)	1	0	(-)
Magnesium sulfate	1	100	(-)	1	0	(-)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	1	100	(-)	0		
Eclampsia managed according to SMI standard (I4080)	1	0	(-)	1	0	(-)

Table D.61: Management of obstetric complications (I4080), eclampsia, comparison, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	3	66.7	(0.3-99.9)	1	100	(-)	2	0	(-)	3	33.3	(0.1-99.7)
Pulse / heart rate	3	100	(-)	1	100	(-)	2	100	(-)	3	100	(-)
Blood pressure	3	100	(-)	1	100	(-)	2	100	(-)	3	100	(-)
Respiratory rate	3	100	(-)	1	100	(-)	2	100	(-)	3	100	(-)
Patellar reflex (complete only)	3	66.7	(0.3-99.9)	1	100	(-)	2	0	(-)	3	33.3	(0.1-99.7)
Lab tests	3	0	(-)	1	0	(-)	2	0	(-)	3	0	(-)
Urine protein	3	100	(-)	1	100	(-)	2	50	(0-100)	3	0	(-)
Platelet count	3	100	(-)	1	100	(-)	2	100	(-)	3	100	(-)
Creatine	3	100	(-)	1	100	(-)	2	100	(-)	3	100	(-)
Uric acid	3	33.3	(0.1-99.7)	1	100	(-)	2	50	(0-100)	3	66.7	(0.3-99.9)
Aspartate aminotransferase / glutamic-oxalacetic transaminase	3	100	(-)	1	100	(-)	2	100	(-)	3	100	(-)
Alanine transaminase / glutamic-pyruvic transaminase	3	100	(-)	1	100	(-)	2	100	(-)	3	100	(-)
Lactate dehydrogenase	3	0	(-)	1	0	(-)	2	50	(0-100)	3	66.7	(0.3-99.9)
All appropriate medications administered	3	100	(-)	1	100	(-)	2	100	(-)	3	33.3	(0.1-99.7)
Magnesium sulfate	3	100	(-)	1	100	(-)	2	100	(-)	3	66.7	(0.3-99.9)
Hydralazine / labetalol / nifedipine (if diastolic blood pressure > 110)	1	100	(-)	1	100	(-)	0			2	50	(0-100)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Eclampsia managed according to SMI standard (I4080)	3	0	(-)	1	0	(-)	2	0	(-)	3	0	(-)

Table D.62: Emergency care services (MI7030), comparison

Description	Baseline			2nd Operation			3rd Operation		
	N	%	CI	N	%	CI	N	%	CI
Dexamethasone	1	100	(-)	7	100	(-)	8	100	(-)
Antibiotics	1	100	(-)	7	100	(-)	8	100	(-)
Gentamicin	1	100	(-)	7	85.7	(25.7-99)	8	100	(-)
Magnesium sulfate	1	100	(-)	7	100	(-)	8	100	(-)
Hydralazine	1	100	(-)	7	100	(-)	8	100	(-)
Ergobasin / ergonovine maleate / ergometrine / oxytocin	1	100	(-)	7	100	(-)	8	100	(-)
All drugs observed day of survey	1	100	(-)	7	85.7	(25.7-99)	8	100	(-)
All drugs continuously available in past three months	1	100	(-)	7	42.9	(9.1-85)	8	100	(-)
Emergency care according to standard (MI7030)	1	100	(-)	7	42.9	(9.1-85)	8	100	(-)

Drug three-month stock only captured for dexamethasone, gentamicin, magnesium sulfate, and oxytocin at baseline evaluations.

D.2.5 Neonatal care

Table D.63: Routine newborn care with quality (I4103), comparison

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vitamin K	12	100	(-)	120	90	(83.1-94.3)	51	84.3	(71.1-92.1)	87	92	(83.9-96.2)
Application of prophylaxis with oxytetracycline ophthalmic/chloramphenicol	12	100	(-)	120	89.2	(82.1-93.7)	51	84.3	(71.1-92.1)	87	92	(83.9-96.2)
Curing the umbilical cord with water and chlorhexidine	12	100	(-)	120	61.7	(52.5-70)	51	84.3	(71.1-92.1)	87	86.2	(77-92.1)
Evaluation for the presence of malformations	12	100	(-)	120	84.2	(76.4-89.7)	51	51	(37.1-64.7)	87	46	(35.6-56.7)
BCG vaccine	12	83.3	(45.7-96.7)	120	82.5	(74.5-88.4)	51	47.1	(33.5-61.1)	87	33.3	(24.1-44.1)
APGAR score (1 or 5 minutes)	12	100	(-)	120	94.2	(88.2-97.2)	51	100	(-)	87	95.4	(88.2-98.3)
Weight	12	100	(-)	120	91.7	(85.1-95.5)	51	100	(-)	87	96.6	(89.6-98.9)
Height	12	100	(-)	120	90	(83.1-94.3)	51	98	(86.6-99.7)	87	95.4	(88.2-98.3)
Head circumference	12	83.3	(45.7-96.7)	120	90	(83.1-94.3)	51	98	(86.6-99.7)	87	95.4	(88.2-98.3)
Respiratory rate	12	8.3	(0.8-50.1)	120	51.7	(42.6-60.6)	51	35.3	(23.1-49.7)	87	25.3	(17.1-35.7)
Routine newborn care with quality (I4103)	12	0	(-)	120	30.8	(23.1-39.8)	51	17.6	(9.2-31.1)	87	13.8	(7.9-23)

The I3040 indicator was first measured at the baseline in which 38.4% of observations met the indicator. In the third operation evaluation period the proportion of observations that met the indicator increased from the baseline with 71.1% of observations meeting the indicator.

Table D.64: Management of neonatal complications (I4070), comparison

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Sepsis managed to standard	33	60.6	(42.4-76.3)	39	35.9	(22-52.6)	22	50	(28.7-71.3)	44	40.9	(27-56.4)
Asphyxia managed to standard	30	33.3	(18.3-52.8)	33	30.3	(16.6-48.8)	6	83.3	(18.6-99.1)	14	42.9	(18.3-71.6)
Low birth weight managed to standard	21	19	(6.7-43.6)	41	29.3	(17-45.5)	23	43.5	(24-65.2)	22	36.4	(18.2-59.5)
Prematurity managed to standard	10	10	(0.9-57.8)	21	14.3	(4.2-38.7)	16	50	(25-75)	22	45.5	(25.1-67.5)
Management of neonatal complications (I4070)	90	37.8	(28.2-48.4)	128	28.9	(21.6-37.5)	49	44.9	(31.3-59.4)	83	37.3	(27.5-48.4)

Table D.65: Management of neonatal complications (I4070), sepsis, comparison, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	27	74.1	(53.2-87.8)	31	45.2	(28-63.5)	16	87.5	(57-97.4)	21	100	(-)
Pulse / heart rate	27	100	(-)	31	100	(-)	16	100	(-)	21	100	(-)
Respiratory rate	27	100	(-)	31	100	(-)	16	93.7	(60.7-99.3)	21	100	(-)
Temperature	27	100	(-)	31	100	(-)	16	93.7	(60.7-99.3)	21	100	(-)
Abdominal examination	27	74.1	(53.2-87.8)	31	45.2	(28-63.5)	16	100	(-)	21	100	(-)
Antibiotics administered	27	92.6	(72.8-98.3)	31	74.2	(55.1-87.1)	16	81.2	(51.4-94.7)	21	85.7	(61.3-95.8)
Evaluated by doctor	27	96.3	(75.5-99.5)	31	74.2	(55.1-87.1)	16	100	(-)	21	100	(-)
Referred to complete facility (if hemodynamic failure or shock)	0			0			0			0		
Sepsis managed to standard	27	74.1	(53.2-87.8)	31	45.2	(28-63.5)	16	68.7	(40.2-87.8)	21	85.7	(61.3-95.8)

Table D.66: Management of neonatal complications (I4070), sepsis, comparison, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	6	66.7	(14.9-95.8)	8	100	(-)	6	83.3	(18.6-99.1)	23	100	(-)
Pulse / heart rate	6	100	(-)	8	100	(-)	6	100	(-)	23	100	(-)
Respiratory rate	6	100	(-)	8	100	(-)	6	83.3	(18.6-99.1)	23	100	(-)
Temperature	6	100	(-)	8	100	(-)	6	100	(-)	23	100	(-)
Abdominal examination	6	66.7	(14.9-95.8)	8	100	(-)	6	100	(-)	23	100	(-)
Lab tests	6	0	(-)	8	0	(-)	6	0	(-)	23	0	(-)
Oxygen saturation	6	16.7	(0.9-81.4)	8	12.5	(0.9-68.1)	6	33.3	(4.2-85.1)	23	8.7	(1.9-31.4)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
C-reactive protein	6	50	(9.1-90.9)	8	25	(4.1-72.4)	6	50	(9.1-90.9)	23	39.1	(20.6-61.4)
Platelets	6	83.3	(18.6-99.1)	8	75	(27.6-95.9)	6	100	(-)	23	95.7	(71.6-99.5)
Leukocytes	6	83.3	(18.6-99.1)	8	87.5	(31.9-99.1)	6	100	(-)	23	95.7	(71.6-99.5)
Hemoglobin	6	16.7	(0.9-81.4)	8	75	(27.6-95.9)	6	50	(9.1-90.9)	23	47.8	(27.4-69)
Hematocrit	6	83.3	(18.6-99.1)	8	75	(27.6-95.9)	6	100	(-)	23	95.7	(71.6-99.5)
Blood culture	6	0	(-)	8	0	(-)	6	0	(-)	23	4.3	(0.5-28.4)
Neutrophil band ratio / absolute ratio	6	0	(-)	8	37.5	(8.7-79.2)	6	66.7	(14.9-95.8)	23	87	(64.2-96.1)
Antibiotics administered	6	66.7	(14.9-95.8)	8	100	(-)	6	100	(-)	23	95.7	(71.6-99.5)
Evaluated by specialist	6	83.3	(18.6-99.1)	8	100	(-)	6	100	(-)	23	91.3	(68.6-98.1)
Sepsis managed to standard	6	0	(-)	8	0	(-)	6	0	(-)	23	0	(-)

Table D.67: Management of neonatal complications (I4070), asphyxia, comparison, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	7	100	(-)	7	100	(-)	1	100	(-)	2	50	(0-100)
Pulse / heart rate	7	100	(-)	7	100	(-)	1	100	(-)	2	100	(-)
Respiratory rate	7	100	(-)	7	100	(-)	1	100	(-)	2	50	(0-100)
APGAR score at one minute	7	100	(-)	7	100	(-)	1	100	(-)	2	100	(-)
APGAR score at five minutes	7	100	(-)	7	100	(-)	1	100	(-)	2	100	(-)
Glycemia	7	0	(-)	7	42.9	(9.1-85)	1	100	(-)	2	50	(0-100)
Oxygen saturation lab test (if APGAR <= 3 at five minutes)	0			0			0			0		
Heat application	7	57.1	(15-90.9)	7	57.1	(15-90.9)	1	100	(-)	2	100	(-)
Oxygen application (if APGAR <= 3 at five minutes)	0			0			0			0		
AMBU / positive pressure ventilation / endotracheal intubation / chest compressions (if APGAR <= 3 at five minutes)	0			0			0			0		
Evaluated by doctor	7	100	(-)	7	71.4	(21.5-95.8)	1	100	(-)	2	50	(0-100)
Referred to complete facility (if APGAR <= 3 at five minutes)	0			0			0			0		
Asphyxia managed to standard	7	0	(-)	7	28.6	(4.2-78.5)	1	100	(-)	2	0	(-)

Table D.68: Management of neonatal complications (I4070), asphyxia, comparison, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	23	100	(-)	26	96.2	(74.6-99.5)	5	100	(-)	12	91.7	(49.9-99.2)
Pulse / heart rate	23	100	(-)	26	96.2	(74.6-99.5)	5	100	(-)	12	100	(-)
Respiratory rate	23	100	(-)	26	96.2	(74.6-99.5)	5	100	(-)	12	91.7	(49.9-99.2)
APGAR score at one minute	23	100	(-)	26	100	(-)	5	100	(-)	12	100	(-)
APGAR score at five minutes	23	100	(-)	26	100	(-)	5	100	(-)	12	100	(-)
Glycemia	23	60.9	(38.6-79.4)	26	42.3	(24.2-62.8)	5	80	(11.1-99.2)	12	66.7	(32.9-89.1)
Oxygen saturation lab test (if APGAR <= 3 at five minutes)	0			1	100	(-)	0			0		
Heat application	23	78.3	(55.2-91.3)	26	96.2	(74.6-99.5)	5	100	(-)	12	100	(-)
Oxygen application (if APGAR <= 3 at five minutes)	0			1	100	(-)	0			0		
AMBU / positive pressure ventilation / endotracheal intubation / chest compressions (if APGAR <= 3 at five minutes)	0			1	100	(-)	0			0		
Evaluated by doctor	23	100	(-)	26	96.2	(74.6-99.5)	5	100	(-)	12	83.3	(45.7-96.7)
Asphyxia managed to standard	23	43.5	(24-65.2)	26	30.8	(15.4-52)	5	80	(11.1-99.2)	12	50	(21-79)

Table D.69: Management of neonatal complications (I4070), low birth weight, comparison, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	9	11.1	(0.9-62.6)	19	26.3	(10.4-52.4)	6	50	(9.1-90.9)	9	33.3	(8.1-73.8)
Weight	9	100	(-)	19	100	(-)	6	100	(-)	9	100	(-)
Pulse / heart rate	9	100	(-)	19	100	(-)	6	100	(-)	9	100	(-)
Respiratory rate	9	100	(-)	19	100	(-)	6	100	(-)	9	100	(-)
Head circumference	9	100	(-)	19	84.2	(57.8-95.4)	6	66.7	(14.9-95.8)	9	55.6	(19.5-86.6)
Silverman-Anderson / Downes test	9	11.1	(0.9-62.6)	19	26.3	(10.4-52.4)	6	83.3	(18.6-99.1)	9	88.9	(37.4-99.1)
APGAR score / skin test	9	100	(-)	19	94.7	(66.2-99.4)	6	100	(-)	9	88.9	(37.4-99.1)
Glycemia	9	0	(-)	19	15.8	(4.6-42.2)	6	50	(9.1-90.9)	9	44.4	(13.4-80.5)
Gestational age calculated using Capurro/Ballard (if in-facility)	9	88.9	(37.4-99.1)	19	94.7	(66.2-99.4)	5	20	(0.8-88.9)	7	57.1	(15-90.9)
Weight classification (if in-facility)	9	100	(-)	19	100	(-)	5	100	(-)	7	100	(-)
Heat application	9	77.8	(33-96.1)	19	84.2	(57.8-95.4)	6	83.3	(18.6-99.1)	9	88.9	(37.4-99.1)
Breastfed / given glucose	9	100	(-)	19	100	(-)	6	83.3	(18.6-99.1)	9	100	(-)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
Evaluated by doctor	9	100	(-)	19	84.2	(57.8-95.4)	6	100	(-)	9	100	(-)
Referred to a complete facility (if weight < 1500 g)	2	0	(-)	3	0	(-)	0			1	100	(-)
Appropriate management of any associated complications	1	100	(-)	2	50	(0-100)	0			2	50	(0-100)
Pneumonia: antibiotics or referral	1	100	(-)	2	50	(0-100)	0			1	100	(-)
Diarrhea: liquids/ORS or referral	0			0			0			0		
Seizures: anticonvulsants or referral	0			0			0			0		
Hypoglycemia: glucose IV or referral	0			0			0			1	0	(-)
Low birth weight managed to standard	9	0	(-)	19	0	(-)	6	0	(-)	9	11.1	(0.9-62.6)

Table D.70: Management of neonatal complications (I4070), low birth weight, comparison, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	12	66.7	(32.9-89.1)	22	72.7	(49-88.1)	17	88.2	(59.1-97.5)	13	61.5	(30.5-85.4)
Weight	12	100	(-)	22	100	(-)	17	100	(-)	13	100	(-)
Pulse / heart rate	12	100	(-)	22	95.5	(70.4-99.5)	17	100	(-)	13	100	(-)
Respiratory rate	12	100	(-)	22	90.9	(67.3-98)	17	100	(-)	13	92.3	(53.1-99.2)
Head circumference	12	91.7	(49.9-99.2)	22	95.5	(70.4-99.5)	17	88.2	(59.1-97.5)	13	100	(-)
Silverman-Anderson / Downes test	12	75	(39.3-93.3)	22	81.8	(58.1-93.6)	17	88.2	(59.1-97.5)	13	61.5	(30.5-85.4)
APGAR score / skin test	12	91.7	(49.9-99.2)	22	100	(-)	17	100	(-)	13	100	(-)
Glycemia	12	75	(39.3-93.3)	22	77.3	(53.5-90.9)	17	76.5	(48.2-91.9)	13	76.9	(42.8-93.7)
Gestational age calculated using Capurro/Ballard (if in-facility)	11	100	(-)	21	90.5	(66-97.9)	15	93.3	(58.4-99.3)	13	100	(-)
Weight classification (if in-facility)	11	100	(-)	21	100	(-)	15	100	(-)	13	100	(-)
Heat application	12	75	(39.3-93.3)	22	100	(-)	17	100	(-)	13	100	(-)
Breastfed / given glucose	12	91.7	(49.9-99.2)	22	90.9	(67.3-98)	17	94.1	(62.7-99.3)	13	92.3	(53.1-99.2)
Evaluated by doctor	12	100	(-)	22	100	(-)	17	100	(-)	13	92.3	(53.1-99.2)
Appropriate management of any associated complications	1	100	(-)	2	100	(-)	3	100	(-)	2	50	(0-100)
Pneumonia: antibiotics	1	100	(-)	2	100	(-)	3	100	(-)	1	100	(-)
Diarrhea: liquids/ORS	0			0			0			0		
Seizures: anticonvulsants	0			0			0			0		
Hypoglycemia: glucose IV	0			0			2	100	(-)	2	50	(0-100)
Low birth weight managed to standard	12	33.3	(10.9-67.1)	22	54.5	(32.5-74.9)	17	58.8	(32.7-80.7)	13	53.8	(24.8-80.5)

Table D.71: Management of neonatal complications (I4070), prematurity, comparison, basic facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	1	100	(-)	3	0	(-)	5	60	(8.1-96.2)	5	60	(8.1-96.2)
Weight	1	100	(-)	3	66.7	(0.3-99.9)	5	100	(-)	5	100	(-)
Pulse / heart rate	1	100	(-)	3	66.7	(0.3-99.9)	5	100	(-)	5	100	(-)
Respiratory rate	1	100	(-)	3	66.7	(0.3-99.9)	5	100	(-)	5	100	(-)
Head circumference	1	100	(-)	3	33.3	(0.1-99.7)	5	60	(8.1-96.2)	5	80	(11.1-99.2)
Silverman-Anderson / Downes test	1	100	(-)	3	66.7	(0.3-99.9)	5	100	(-)	5	80	(11.1-99.2)
APGAR score / skin test	1	100	(-)	3	33.3	(0.1-99.7)	5	100	(-)	5	80	(11.1-99.2)
Glycemia	1	100	(-)	3	66.7	(0.3-99.9)	5	20	(0.8-88.9)	5	100	(-)
Gestational age calculated using Capurro/Ballard (if in-facility)	1	100	(-)	2	50	(0-100)	2	100	(-)	5	100	(-)
Weight classification (if in-facility)	1	100	(-)	2	100	(-)	2	100	(-)	5	100	(-)
Heat application	1	100	(-)	3	33.3	(0.1-99.7)	5	80	(11.1-99.2)	5	100	(-)
Breastfed / given glucose	1	100	(-)	3	100	(-)	5	80	(11.1-99.2)	5	100	(-)
Evaluated by doctor	1	100	(-)	3	100	(-)	5	100	(-)	5	100	(-)
Referred to a complete facility (if weight < 1500 g)	0			0			1	0	(-)	1	100	(-)
Appropriate management of any associated complications	0			1	100	(-)	0			2	50	(0-100)
Pneumonia: antibiotics or referral	0			0			0			1	100	(-)
Diarrhea: liquids/ORS or referral	0			0			0			0		
Seizures: anticonvulsants or referral	0			0			0			0		
Hypoglycemia: glucose IV or referral	0			1	100	(-)	0			1	0	(-)
Prematurity managed to standard	1	100	(-)	3	0	(-)	5	0	(-)	5	60	(8.1-96.2)

Table D.72: Management of neonatal complications (I4070), prematurity, comparison, complete facilities

Description	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Vital signs checked	9	22.2	(3.9-67)	18	50	(26.4-73.6)	11	90.9	(46.3-99.1)	17	76.5	(48.2-91.9)
Weight	9	100	(-)	18	100	(-)	11	100	(-)	17	100	(-)
Pulse / heart rate	9	100	(-)	18	94.4	(64.5-99.4)	11	100	(-)	17	100	(-)
Respiratory rate	9	100	(-)	18	88.9	(61.1-97.6)	11	100	(-)	17	100	(-)
Head circumference	9	44.4	(13.4-80.5)	18	66.7	(40.3-85.6)	11	100	(-)	17	100	(-)

	Baseline			2nd Operation			3rd Operation: Pre-evaluation			3rd Operation: Evaluation		
	N	%	CI	N	%	CI	N	%	CI	N	%	CI
Silverman-Anderson / Downes test	9	44.4	(13.4-80.5)	18	72.2	(45.3-89.1)	11	90.9	(46.3-99.1)	17	76.5	(48.2-91.9)
APGAR score / skin test	9	100	(-)	18	88.9	(61.1-97.6)	11	100	(-)	17	100	(-)
Glycemia	9	55.6	(19.5-86.6)	18	44.4	(22.2-69.1)	11	72.7	(35.4-92.8)	17	52.9	(28-76.5)
Gestational age calculated using Capurro/Ballard (if in-facility)	6	100	(-)	14	100	(-)	11	100	(-)	17	100	(-)
Weight classification (if in-facility)	6	83.3	(18.6-99.1)	14	100	(-)	11	100	(-)	17	100	(-)
Heat application	9	55.6	(19.5-86.6)	18	72.2	(45.3-89.1)	11	100	(-)	17	100	(-)
Breastfed / given glucose	9	88.9	(37.4-99.1)	18	94.4	(64.5-99.4)	11	90.9	(46.3-99.1)	17	94.1	(62.7-99.3)
Evaluated by doctor	9	100	(-)	18	100	(-)	11	100	(-)	17	100	(-)
Appropriate management of any associated complications	0			0			1	100	(-)	1	0	(-)
Pneumonia: antibiotics	0			0			1	100	(-)	0		
Diarrhea: liquids/ORS	0			0			0			0		
Seizures: anticonvulsants	0			0			0			0		
Hypoglycemia: glucose IV	0			0			0			1	0	(-)
Prematurity managed to standard	9	0	(-)	18	16.7	(4.8-44.1)	11	72.7	(35.4-92.8)	17	41.2	(19.3-67.3)

D.2.6 Data for decision-making

Table D.73: Use of data for decision-making (I7500), comparison, hospitals

Description	3rd Operation		
	N	%	CI
Plans observed for at least 4 of past 6 months	8	100	(-)
Follow-up action taken for one randomly selected month	8	100	(-)
Use of data for decision-making (I7500)	8	100	(-)

D.2.7 Indicator matrices

Table D.74: Health facility MRR-based performance indicators

Indicator	Description	Time Period	N	%	CI
I3040	First ANC within 12 weeks	Baseline	73	38.4	(27.7 - 50.2)
		1st Operation	Not measured at 1st operation		
		2nd Operation	178	55.6	(48.2 - 62.8)
		3rd Op. Pre-evaluation	55	69.1	(55.3 - 80.1)
		3rd Op. Evaluation	97	71.1	(61.2 - 79.4)
I4103	Routine newborn care with quality	Baseline	12	0	(-)
		1st Operation	Not measured at 1st operation		
		2nd Operation	120	30.8	(23.1 - 39.8)
		3rd Op. Pre-evaluation	51	17.6	(9.2 - 31.1)
		3rd Op. Evaluation	87	13.8	(7.9 - 23)
I4070	Management of neonatal complications	Baseline	90	37.8	(28.2 - 48.4)
		1st Operation	Not measured at 1st operation		
		2nd Operation	128	28.9	(21.6 - 37.5)
		3rd Op. Pre-evaluation	49	44.9	(31.3 - 59.4)
		3rd Op. Evaluation	83	37.3	(27.5 - 48.4)
I4080	Management of obstetric complications	Baseline	75	22.7	(14.4 - 33.8)
		1st Operation	Not measured at 1st operation		
		2nd Operation	127	25.2	(18.3 - 33.6)
		3rd Op. Pre-evaluation	45	24.4	(13.8 - 39.6)
		3rd Op. Evaluation	84	19	(11.9 - 29.1)
I6005	Cervical cancer screening with quality	Baseline	Not measured at baseline		
		1st Operation	Not measured at 1st operation		
		2nd Operation	Not measured at 2nd operation		
		3rd Op. Pre-evaluation	Not measured at 3rd operation pre-evaluation		
		3rd Op. Evaluation	82	57.3	(46.2 - 67.7)

Table D.75: Health facility observation-based performance indicators

Indicator	Description	Time Period	N	%	CI
I7500	Use of data for decision-making	Baseline	Not measured at baseline		
		1st Operation	Not measured at 1st operation		
		2nd Operation	Not measured at 2nd operation		
		3rd Operation	8	100	(-)

Table D.76: Health facility MRR-based monitoring indicators

Indicator	Description	Time Period	N	%	CI
MI3030	At least four antenatal care (ANC) visits to standard	Baseline	79	21.5	(13.7 - 32.2)
		2nd Operation	203	20.2	(15.2 - 26.3)
		3rd Op. Pre-evaluation	61	50.8	(38.1 - 63.4)
		3rd Op. Evaluation	105	53.3	(43.6 - 62.8)
MI4050	Maternal postpartum care within two hours after birth	Baseline	Not measured at baseline		
		2nd Operation	117	85.5	(77.7 - 90.8)
		3rd Op. Pre-evaluation	32	78.1	(59.6 - 89.7)
		3rd Op. Evaluation	60	76.7	(64 - 85.9)
MI4065	Partograph completion for uncomplicated deliveries	Baseline	Not measured at baseline		
		2nd Operation	131	96.2	(91.1 - 98.4)
		3rd Op. Pre-evaluation	51	84.3	(71.1 - 92.1)
		3rd Op. Evaluation	87	73.6	(63.1 - 81.9)
MI4095	Active management of the third stage of labor	Baseline	12	91.7	(49.9 - 99.2)
		2nd Operation	131	89.3	(82.7 - 93.6)
		3rd Op. Pre-evaluation	51	86.3	(73.4 - 93.5)
		3rd Op. Evaluation	87	83.9	(74.4 - 90.3)

Table D.77: Health facility observation-based monitoring indicators

Indicator	Description	Time Period	N	%	CI
MI7000	Cold chain	Baseline	19	42.1	(21.1 - 66.5)
		2nd Operation	18	72.2	(45.3 - 89.1)
		3rd Operation	12	91.7	(49.9 - 99.2)
MI7010	Child care services	Baseline	22	27.3	(11.9 - 51)
		2nd Operation	26	30.8	(15.4 - 52)
		3rd Operation	18	55.6	(30.9 - 77.8)
MI7020	Pre/postnatal care services	Baseline	23	17.4	(6.2 - 40.3)
		2nd Operation	26	53.8	(33.8 - 72.7)
		3rd Operation	18	50	(26.4 - 73.6)
MI7030	Emergency care services	Baseline	1	100	(-)
		2nd Operation	7	42.9	(9.1 - 85)
		3rd Operation	8	100	(-)
MI7050	Contraceptive services	Baseline	23	69.6	(46.6 - 85.7)
		2nd Operation	24	70.8	(48.5 - 86.3)
		3rd Operation	15	73.3	(42.9 - 91)
MI8870	Sociocultural conditions	Baseline	3	33.3	(0.1 - 99.7)
		2nd Operation	3	66.7	(0.3 - 99.9)
		3rd Operation	3	33.3	(0.1 - 99.7)

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About IHME

The Institute for Health Metrics and Evaluation (IHME) is an independent population health research center at UW Medicine, part of the University of Washington, that provides rigorous and comparable measurement of the world's most important health problems and evaluates the strategies used to address them. IHME makes this information freely available so that policymakers have the evidence they need to make informed decisions about how to allocate resources to best improve population health.

IHME aspires to make available to the world high-quality information on population health, its determinants, and the performance of health systems. We seek to achieve this directly, by catalyzing the work of others, and by training researchers as well as policymakers.

Our mission is to improve the health of the world's populations by providing the best information on population health.

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