

EVALUATION OF A TRADITIONAL BIRTH ATTENDANT AND COMMUNITY  
HEALTH LEADER TRAINING AND MENTORING PROGRAM:  
MATAGALPA, NICARAGUA

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## **Abstract**

Evidence strongly shows that the risk of childbirth is best mitigated through giving birth at or near a health institution with emergency obstetrical services and receiving regular prenatal visits. These interventions have been shown to improve maternal morbidity and mortality. Many under-resourced areas of the world continue to have difficulty connecting poor rural women to these services. In Matagalpa, Nicaragua a pioneering project, “Destrezas para Salvar Vidas,” was implemented in August 2011 to provide training and mentorship to the traditional birth attendants and community health leaders to connect pregnant women in rural communities with the formal health sector. This project was evaluated at the one-year point through tests of knowledge both before and after an initial one-week training, records of activities conducted by participants, and interviews with program participants and mentors. The aggregate test scores of participants’ knowledge during the initial week of training increased from an average score of 59.5% to 79.9% (differences 21.4%,  $p < 0.001$ ). Of the pregnant women in contact with program participants, 93% delivered at an institution, compared to 81% of all pregnant women in Matagalpa. Participants performed an average of 51 home visits each over the year. Reciprocal trust and communication increased between community participants and health sector workers. Participants felt empowered to take active roles in the health system: activating emergency services when needed, accompanying women during labor and delivery at health centers, and embracing a greater leadership role in their communities. While this project is only one of many that the ministry of health employs to reduce maternal mortality, it can be a model for increasing community engagement and referrals to the formal health sector in a resource-limited area.

## Introduction

The World Health Organization (WHO) defines a Traditional Birth Attendant (TBA) as a person who assists the mother during childbirth and who initially acquired her skills by delivering babies herself or through an apprenticeship to other TBAs. A trained TBA is any TBA who has received a short course of training through the modern health sector to upgrade her skills (1). Community Health Workers (CHW) are lay health providers who receive training and support from either their local government and/or other organization. Both TBAs and CHWs continue to be important health care providers in under-resourced areas globally, most frequently utilized in rural areas where access to formal health services is limited. Many individuals, government and non-government organizations have performed training of TBAs and CHWs over the last few decades, in a variety of settings around the globe. These trainings range from basic to elaborate, may include follow-up teaching, and rarely have a clinical component (2-4).

Scientifically rigorous evaluation of the impact of training traditional birth attendants has been difficult due to numerous methodological and logistical challenges. TBA training is often only one component of a comprehensive intervention. This makes it difficult to measure the impact of TBA training on maternal and infant mortality rates. In meta-analysis, a 12% pooled reduction in all-cause perinatal mortality rates of mothers and a 22-47% reduction in intra-partum related neonatal mortality in populations served by trained versus untrained TBAs (3) were found for women working with trained TBAs. Referral rates to a hospital or clinic for labor and delivery are significantly higher for trained TBAs than those without training (2). Other meta-analyses of research of TBA training have shown that training TBAs may increase antenatal care attendance rates by

about 38% (5). Training also leads to significant, large changes in TBA knowledge, attitudes, behavior and advice to patients and a small, but significant decrease in perinatal mortality of mothers (8% decrease) and birth asphyxia mortality for neonates (11%) (6). The effectiveness of these training programs was dependent on the linkage of the programs to other community strategies for reducing maternal and neonatal mortality (3).

The United Nations' Millennium Development Goal 5 seeks to reduce the Maternal Mortality Rate (MMR) by 75% from 1990 to 2015 (1, 7, 8). In 2000, it was estimated that up to 529,000 women die each year during complications due to pregnancy and 22,000 of these deaths occurred in Latin America (7, 9). More recent estimates show that the global number of maternal deaths has decreased to 342,900 with an annual MMR of 251 per 100,000 live births in 2008 (10, 11). In the Central American country of Nicaragua, maternal mortality has been on a similar decline for over 20 years. The UN estimated that the Nicaraguan MMR went from 190/100,000 in 1990 down to approximately 100/100,000 in 2010 (12). The Nicaraguan government estimates that their MMR is even lower than the UN estimate at 67/100,000 (13). The Department of Matagalpa has a MMR higher than the national average and some of the lowest utilization rates of prenatal care and institutional births. The Department of Matagalpa has seen a decline in MMR from 160/100,000 in 2001 to 75/100,000 in 2011 (14, 15). Approximately 19% of women in the Department of Matagalpa receive no prenatal care and 21% of those who did receive care attended fewer than the recommended four antenatal care visits (16). The percentage of women delivering at an institution rose from 45% of all deliveries in 2005, to 65% after the beginning of the implementation of

concerted efforts by the ministry of health in 2007, and by 2011 had reached 81% of all deliveries (16, 17).

Prior to the Sandinista revolution in the 1980s, most deliveries happened at home and were attended by family members or untrained midwives. An estimated 68% of births did not have place or attendant recorded in the national registry (18). During this time less than 10% of women had access to modern contraceptive methods contributing to the total fertility rate of 5.9 in the early 1980s (19). Traditional birth attendants received compensation from families and customarily learned from more experienced TBAs in their community. Many of these TBAs received training in safe delivery practices in the 1980s and early 1990s (20).

Knowledge among women about the reason for and importance of prenatal care is associated with higher utilization of health services during the entire perinatal period (21). Known factors that motivate women to deliver at an institution rather than at home include: quality of care at the facility, affordability of the care provided, and education level of the mother (22-25).

Nicaragua's public healthcare system is operated through the Ministry of Health (Ministerio Nacional de Salud or MINSa). It is subdivided into 17 smaller departments at the Department level in a system called: *Sistema Local de Atención Integral de Salud* (SILAIS). These smaller departments are responsible for providing direct patient care, managing health centers and posts, education to health providers (including TBAs and CHLs), and collection of epidemiological data (20).

Current maternal health strategies include: humanizing the birth process in facilities, providing care, medication and equipment free of charge, and promoting health education to women in the most at-risk communities.

MINSA utilizes a series of maternity waiting houses, called the *Casa Materna*, to house women close to their delivery date. These are low-cost lodging services that provide the most basic amenities (a bed, bathroom and basic food) during the final two weeks of a woman's pregnancy. NGOs and local governments manage the houses and many provide additional healthcare and educational services (20). The thought is that women at the *Casa Materna* are more likely to deliver at an institution. This has been shown to increase the number of institutional births, but it is uncertain if it contributes directly to a decrease in maternal mortality (26).

*Humanización del Parto* ("Humanizing Birth") is a MINSA program intended to provide a higher quality of care during labor. This includes the goals that the woman giving birth is in control of decisions made, and saying who is with her in the delivery room, that obstetrical services are evidenced-based, and that there is a focus on education and support in the community (27).

This project specifically addresses the following MINSA goals for 2012 (13):

- *Fortalecimiento de la Organización y la Gestión Para mejorar los servicios de salud ala embarazada, puérpera y atención a la fertilidad*
- *Fortalecimiento del modelo de salud familiar y comunitario*
- *Encuentros de la Red Comunitaria con los Equipos salud Familiar en los red de servicios para capacitación, análisis e intercambio de información y planificación actividades con la comunidad.*

(Strengthening of organization and management to better health services to pregnant women, postpartum women and fertility care.

Strengthen the family and community health model.

Meetings of the community network with the family health teams in the network of services to train, analyze and exchange information and activity planning with the community.)

Currently, SILAIS Matagalpa works with a network of a few hundred community volunteers. These volunteers receive basic health training at the health centers, help with community health fairs in their communities, aid in vaccination and other public health programs, and are the eyes and ears of the ministry of health for new health problems in their community. Many of these volunteers have worked as traditional birth attendants for their community in addition to public health outreach projects with SILAIS. These community volunteers receive a wide variety of training, but it is on a broad array of subjects with minimal topic follow-up, as well as minimal interaction with health post and center nurses and physicians (14, 28).

Although many programs have been implemented to increase the skills of midwives and other traditional birth attendants, the *Destrazas Para Salvar Vidas* (Skills to Save Lives) project was innovative in showing that long-term mentorship is crucial to build on skills learned in the initial training as well as to gain acceptance within the formal health system.

This is an evaluation of the first year of participation of the first two groups of TBAs and CHLs to be trained through this project. Officials from SILAIS Matagalpa, who work on other state maternal health programs, are conducting the training, logistics and mentoring for the project. The hope was that, if successful, this project would become integrated as part of the maternal health program of SILAIS Matagalpa. SILAIS Matagalpa is affiliated with many community health promoter programs already and requested evidence that this is a worthwhile investment of their scarce financial resources.

## **Background**

### **Study Setting:**

The evaluation was conducted in rural areas of the Department of Matagalpa, in north-central Nicaragua. The department has a population greater than 480,000 (2005 census), is situated in low-lying mountains and has an area of 640.6 km<sup>2</sup> (30). The population is mostly rural and transportation to the capital can be time-consuming and difficult. The DPSV Project is located in Matagalpa, the department capital. These communities are served by TBA and CHL participants and by smaller health outposts, staffed by a physician and/or nurse. Matagalpa has one of the highest maternal mortality rates in Nicaragua and the maternal deaths are concentrated in these rural areas with difficult access to prenatal services. Participating communities were chosen by health post staff in the four participating municipalities: Tuma La Dalia, Río Blanco, Matiguas, and Waslala, the rural areas with the highest number of maternal deaths in the last five years (16, 31).

### **Developing a Program to Mentor and Empower:**

In July 2011, SILAIS Matagalpa initiated a project in conjunction with the US based non-profit organization Women's Empowerment Network to train and mentor TBAs and CHLs. This public-private partnership project known as *Destrezas Para Salvar Vidas* (DPSV) has the goal of contributing to the reduction in perinatal morbidity and mortality by focusing on the municipalities with the highest rates of maternal and neonatal health problems (29). This project is conducted in conjunction with *Plan Parto*

and *Humanización del Parto*. The project aimed to improve maternal health through increased capacity building of the local TBAs, called Parteras, and Community Health Leaders (CHL), leading to increased patient referral rates for prenatal care and institutional deliveries. The mentoring component was added to the customary training to provide the link between classroom theory and the daily work of the TBA in her community, to the end that her practices are consistent with the teaching given and standards of the Ministry of Health. The first week of the program consisted of classroom and clinical training of the TBAs and CHLs. The majority of project participants had been previously integrated into the network of lay health people directed by SILAIS Matagalpa. Ministry of Health staff led the training. Each project participant was paired up with a mentor. The mentors are nurses from the participants' referral health post or center and are currently involved in care of pregnant women.

### **Training & Mentoring Program**

This program trained local TBAs and CHLs who had been practicing for many years in the Matagalpa area. Each participant worked with a mentor from SILAIS Matagalpa (an obstetric nurse). The training addressed the components of and reasons for prenatal care, normal labor and delivery, and how to recognize the signs of obstetrical complications. The goal of the program was for participants to encourage women in their communities to attend a minimum of four prenatal visits and to deliver at an institution that is prepared for obstetrical complications. In the case that women do need to or decide to deliver in their rural community, the participants were provided with basic training in how to safely attend a delivery.

The five days of training were conducted by the mentors and overseen by health trainers from SILAIS. The first three days consisted of theory and practice with mannequins; the final two days were spent in the Hospital Regional de Matagalpa in the labor and delivery ward. Each project participant was assigned a mentor who was an obstetric nurse from the Health Center where the participant would refer his or her patients. Each mentor worked with multiple participants. The TBA or CHL recorded her activities in a workbook (home visits, meetings with the local health community, and health talks given in the community). Each participant was to meet twice a month with her mentor. These regular and structured meetings were designed to enable the mentor to understand the daily activities and challenges of the TBA or CHL: home visits, community meetings and health talks given, and to reinforce concepts the participant was taught in the classroom. The goal of this project was to strengthen the working relationships between MINSA health workers and the community health leaders, to train CHLs, and to increase the exchange of ideas and activities between the two groups.

The intention of the project was that each participant meet monthly with his or her mentor, both at the referral center and in the community, thus enabling both parties to gain a greater understanding of the work environment of the other. Meetings between mentor and participant were used to share information about pregnant women in the community, to address other health and social issues in the community, to practice newly acquired skills, to allow time for both parties to get to know one another better and to empower participants to take an active role as health providers within SILAIS Matagalpa. Additional trainings were held twice during the year to reinforce skills. Project participants were encouraged to perform home visits to prenatal and postpartum women,

newborns, and other ill people in their community and to conduct community workshops. A cash reimbursement was provided to participants for travel and lunch expenses on days they had to travel outside of their community for project activities. Each community participant was provided with a workbook with which to record their activities and to follow the care of the pregnant women in their community. They were also supplied with a backpack with essential supplies for prenatal care that included a blood pressure cuff and thermometer.

### **Other duties of Program Participants**

TBAs and CHLs were to take on greater leadership roles in all areas of health in their communities. They organized and led community health committees that consisted of local leaders. The committees prepared the community for emergency situations by identifying who in the community would help transport patients in need of care, participated in fundraising to create a pool of emergency funds for costs associated with emergent evacuation, checked in with the health needs of the community, and were available to help with public health outreach programs (vaccination campaigns, finding sick patients, organize trash clean-up days). TBAs and CHLs also give health talks that cover a range of topics including women's health and other topics deemed important by the community (hand washing, clean spaces, domestic violence). The health talks are given to small groups from a few households or larger groups in community buildings such as the school.

An additional task is for the TBAs and CHLs to conduct home visits. This was initiated to check in with the pregnant women to verify that they are following through

with prenatal care in the formal health system. They are also expected to visit women postpartum and their newborn infants. As these participants now have received extended healthcare training, they have an increasing general healthcare role in their community. They are encouraged to visit other community members with health complaints to help triage the patients into needed care.

### **Evaluation Objectives**

The DPSV project aimed to continue the education for the TBAs and CHLs and sensitize the mentors to the challenges faced by the patients and the communities in which they work. The goal for the evaluation was to determine if 1) TBA and CHL participants acquired new knowledge from the initial week of training; 2) program participation led to increased referrals for prenatal visits and institutional births; 3) the TBAs and CHLs felt as if they were a part of the healthcare system and felt empowered as health workers and 4) the mentors deepened their understanding of the women and families in their communities.

## **Materials and Methods**

### **Date & Location of Study**

The multimodal evaluation of the project, “Destrezas para Salvar Vidas” (DPSV project), was performed as a prospective evaluation to test the hypothesis that the project increased CHL and TBA knowledge, increased utilization of SILAIS services and strengthened the relationship between community participants and SILAIS healthcare providers. It consisted of data collection and participant interviews. The DPSV project initiated in August 2011 and was continuing as of September 2012. The evaluation was performed August-September 2012 in the health posts and health centers of rural Matagalpa, Nicaragua. These are Ministry of Health outposts and SILAIS Matagalpa regularly performs community health leader training at these locations. Participants were notified at the initiation of the project that they would participate in the evaluation and were reminded by phone prior to their regularly scheduled meeting that they would be asked to participate. IRB exemption was attained prior to initiation of the evaluation.

### **Participants**

All participants in the evaluation were actively involved in the project during the prior year. Additionally, participants had to be at least 18 years old; have a role of mentor, traditional birth attendant, community health leader, or support staff of the project; live in the Department of Matagalpa (catchment area for SILAIS Matagalpa); and be able to understand and provide verbal informed consent. We attempted to interview and collect data from all participants of the project.

## **Methods for Evaluating “Skills to Save Lives”**

The DPSV project aimed to continue the education for the TBAs and sensitize the mentors to the challenges faced by the patients and the communities they care for. This evaluation sought to appraise how well these goals were realized through the following:

- 1.** Exams were given to TBAs and CHLs before their initial week of training and again at the end of that week. The exams were created by SILAIS Matagalpa to test knowledge of peri-partum care specific to rural Nicaragua. Data from the two time points were compared using a paired T-test to assess the amount learned during training.

- 2.** Aggregated, anonymized data were gathered from participants’ workbooks. These data include the number of women accessing health facilities for prenatal care and number of prenatal visits and location of deliveries by women working with participating TBAs and CHLs. Data from the epidemiology department in SILAIS regarding the number of prenatal visits and the percentage of institutional births of the general population of Matagalpa were collected. These data were utilized as a representative sample of the population of all women in the SILAIS catchment area as the comparison population. The average number of prenatal visits of women seen by project participants was compared to the average number of prenatal visits of women in the general catchment area who attend that same health center. The percentage of all deliveries that occur in institutions versus at home-deliveries was compared between the two groups.

3. TBA and CHL participants and the mentors who had given verbal consent were interviewed individually. The interviews consisted of semi-structured, open-ended questions regarding their experiences with the project. The 30-60 minute interviews were conducted in Spanish, audio recorded, with initial notes taken during the interview. Interviews were conducted at participating health posts. Each participant received a reimbursement for lunch and travel to the interviews.

Immediately following the interviews, the primary investigator wrote a one page contact summary detailing the overarching themes of the interview. Additional themes and details missed from the initial notes were extracted from the audio recordings of the interview and were added to the contact summary. Data reduction began by listening a second time to the recordings of the first few interviews to understand the flow of the narratives. These narratives were used as a guide for note taking for the subsequent interviews; these provide a consistent framework for summary pages. After the compilation of the individual notes and summaries, an across-case comparison was conducted. The primary investigator presented the initial narrative analyses to other members of the research group to verify the interpretation.

### **IRB**

Institutional Review Board of the Human Subjects Division at University of Washington in Seattle, USA determined the study to be exempt from review because “the UW Human Subjects Division has determined that this activity does not meet the federal definition of research”. This project was given exemption #43445 and was approved by the Health Director for SILAIS Matagalpa, Nicaragua.

# Results

## Participant Characteristics

A total of 40 individuals, both traditional birth attendants and community health leaders, were trained during two sessions in August and November of 2011. As of August 2012, when this evaluation was conducted, there were 27 active CHLs and TBAs. Of the 13 participants who are no longer working with the project: 1 participant passed away, 7 were removed from the project as their municipality was assigned to a different department and they were no longer eligible to participate in SILAIS Matagalpa activities, and 5 participants moved or quit the project for personal reasons.

There are currently 25 female and 2 male TBA and CHL participants. They range in age from 18 to 67 years old with formal education levels from none through completion of secondary education. They come from communities in 4 municipalities of the Department of Matagalpa: La Dalia, Matiguas, Río Blanco and Waslala. All but 4 had worked in some capacity as a TBA in the past and all had volunteered as CHLs.

The mentors are all employees of SILAIS Matagalpa and work as nurses or nurse aides. All of the mentors are actively involved in prenatal care and/or deliveries at their health post or health center. Each TBA or CHL was matched up with one nurse mentor. Each nurse mentor worked with multiple participants (from 5 to 8 participants each) from communities that report to the health post or center where they work. There were a total of 6 nurse mentors.

Of the project participants, 19 CHLs and TBAs were interviewed and data collected from their workbooks. Six nurse mentors were interviewed. Multiple attempts were made as needed to contact and meet with each project participant.

The evaluation started with testing TBAs and CHLs during their initial week of training to determine increased comprehension of training material. Activities documented in the TBA's and CHL's workbooks were tallied. In-depth interviews were conducted with various participants of the program: TBAs, CHLs, mentors, SILAIS officials overseeing various parts of maternal health, and people involved in running the program.

### **Test of Knowledge**

A paired-samples t-test was performed to compare the percentage scores of participants on a test of general perinatal care knowledge before the initial one-week training and a post-test immediately after the training. This was given to all 40 participants who participated in the project. There was a significant difference in the scores for all participants, with an average score of 58.5% ± 15.6 before training and 79.9% ± 11.4 after the initial week, a difference of 21.2% (p<0.001) (Table 1). These results suggest that both that test scores and knowledge increased for both groups due to the initial one-week training.

**Table 1. Scores of Participants on Written Tests of Medical Knowledge**

	<b>Pre-Training Test Average Score</b>	<b>Post-training Test Average Score</b>	<b>Difference</b>
<b>Aggregate Scores for 40 Participants</b>	59.5% ±15.6	79.9% ± 11.4	21.4% (p<0.001)

### **Workbook Analysis**

Of the 19 workbooks reviewed, 3 were left completely blank. The participants with the empty workbooks verbally confirmed having completed many more activities

than they recorded in their workbooks. Two other participants did not have their workbooks with them at the time of the meeting. Additionally, six of the participants were unable to be interviewed and this also meant that their information was not counted toward the total of activities performed by this group nor toward the percentage of institutional births.

Of the three participants with largely incomplete workbooks, two had found community members who were able to partially record information of activities completed. The third woman had her daughter write a list of pregnant women and the location of delivery on a separate sheet of paper. Of the 16 workbooks that had been at least partially completed, the level of completion varied immensely. A small number were filled out with exacting detail. Most had areas of weakness. Many had incomplete recordings of the activities that they had completed in their community, including instances of lacking the following: number of prenatal visits completed by pregnant women, number of house visits made by the participant both to pregnant women and to other community members, and topics covered during community educational talks.

For consistency among participants, only the activities recorded in the workbook were counted toward the tally of activities completed. The majority of participants verbally reported a much greater number of activities compared to their written reports. It was decided that the estimate of home deliveries versus institutional deliveries, as recorded in the workbooks, was fairly accurate as it was almost identical to the verbal report by participants and SILAIS Matagalpa officials for those communities. The other numbers were counted as a total number of activities completed by participants. This did

not allow for comparison to SILAIS epidemiological data but was used for reporting to the funding agency of activities completed.

In the 16 completed workbooks reviewed, a total of 276 pregnant women were recorded as having been contacted by DPSV participants. The participants reported performing 476 prenatal home visits, 175 postpartum visits, 193 home visits to newborns, and 93 home visits for other ailments (Table 2). Of the pregnant women served by the participants, according to the participants' workbooks, 22 had received no MINSA prenatal care, 38 had 1 visit, 31 had 2 visits, 44 had 3 visits and 48 had 4 or more visits (Table 3). According to the data recorded in the workbooks, 26% of the women affiliated with project participants attended the desired 4 prenatal visits. In contrast, MINSA states that 79% of pregnant women attended at least 4 prenatal visits during their pregnancy. The health promoters recorded performing 60 separate health talks in their communities to groups of 2 to 50 participants (Table 2).

**Table 2. Home visits performed by 16 participants interviewed:**

	Home Visits				Community Involvement				Number of Meetings with Mentor
	Prenatal	Post-partum	New-born Visits	Other visits	Health Committee Members <sup>1</sup>	Health Committee Meetings <sup>2</sup>	Health Talks <sup>3</sup>	Attendance Range at Talks <sup>4</sup>	
<b>1</b>	47	10	12	4	3	--	3	4 – 35	--
<b>2</b>	41	9	10	--	--	--	7	3 – 10	--
<b>3</b>	10	1	1	--	12		10	8 – 37	--
<b>4</b>	Did not fill out this portion of the workbook								
<b>5</b>	9	2	2		--	--	--	--	--
<b>6</b>	14	7	12	2	-	3	4	9 – 4	7
<b>7</b>	17	3	2	14	--	1	--	--	--
<b>8</b>	53	23	38	16	8	2	16	4 – 8	5
<b>9</b>	92	67	59	15	--	11	5	2 – 20	5
<b>10</b>	13	3	10	11	--	1	2	6 – 25	--
<b>11</b>	Did not bring workbook to the interview								
<b>12</b>	16	8	7	12	--	1			2
<b>13</b>	28	12	12	6	5	8	6	4 – 43	4
<b>14</b>	8	10	10	1	--	--	--	--	1
<b>15</b>	52	13	11	8	--	2	5	8 – 50	2
<b>16</b>	38	4	4	4	--	3	2	28 – 30	--
<b>17</b>	35	--	--	--	--	7	--	--	1
<b>18</b>	29	3	3	--	12	--	--	--	--
<b>19</b>	Did not fill out this portion of the workbook								
<b>Total</b>	467	175	193	93	40	39	60		

-- Data not recorded in the workbook

<sup>1</sup> Number of community members actively involved in health activities with participants

<sup>2</sup> Number of times that the health committee members met

<sup>3</sup> Number talks that participants gave to members of the community

**Table 3. Prenatal visits realized by pregnant women in project:**

Participant	Pregnant Women	Prenatal Visits					Delivery Location		# not Delivered	Comments
		0	1	2	3	4+	Institution	Home		
1	18	2	3	3	3	7	11	0	7	
2	16	3	3	0	8	2	11	2	3	
3	5	1	0	0	2	2	4	1	0	
4	11	--	--	--	--	--	7	1	3	Had a list of names, dates, and locations of delivery
5	8	1	3	0	0	4	5	1	2	
6	22	4	2	5	6	0	16	1	5	
7	13	0	7	5	1	0	7	0	6	
8	14	0	1	3	2	8	9	0	5	
9	25	2	9	5	5	4	13	2	10	
10	8	4	1	0	0	3	2	0	6	
11	--	--	--	--	--	--	--	--	--	Did not have workbook; no names written elsewhere
12	12	1	3	3	2	3	7	0	5	
13	18	4	2	2	4	6	12	0	6	
14	3	0	0	2	1	0	1	0	2	
15	15	0	1	1	6	6	8	1	6	
16	12	0	3	2	4	3	6	0	6	
17	32	--	--	--	--	--	24	2	6	
18	17	--	--	--	--	--	14	1	2	No numbers; she says they do go to prenatal visits
19	27	--	--	--	--	--	24	0	3	No workbook; numbers from sheet of paper
<b>Total</b>	276	22	38	31	44	48	181	12	83	

-- Data not recorded in the workbook

Of the pregnant women recorded by the interviewed project participants who delivered during the first year of the DPSV project (n=193), 93% delivered at health care institutions (181). Project participants performed the 5% (n=10) of deliveries that did not happen at a SILAIS institution; family members attended 2 other deliveries. This is in comparison to an official institutional delivery rate of 81% in 2011 for all of Matagalpa.

Mentors and project participants were to meet on a regular basis both in the community and at the health post. However, no specific frequency for these meetings was set. The majority of participants were able to meet at least once every 6 months; 72% met during the first six months and 68% in the second six-month time period. A smaller number met more than once; 40% met at least twice in the first six months and only 28% met two or more times in the second six-month period. Although all participants were supposed to have completed a one-day internship experience in their designated health post, only 11 did so in the first year.

**Table 4. Training and Mentoring support sessions**

	<b>Aug – Dec 2011</b>	<b>Jan – Jun 2012</b>
# Mentor/Participant meeting – Community	18	3
# Mentor/Participant meeting – Health Post	10	10
# (%) Mentor/TBA or CHL pair: met at least once	#28 (72%)	#27 (68%)
# (%) Mentor/TBA or CHL: met 2+ times	16 (40%)	11 (28%)
# Of internships in a health center	3	8

## **Interview Themes**

### **Traditional Birth Attendants and Community Health Leaders**

#### **Improved communication with mentors and the formal healthcare system**

Most community health leaders and traditional birth attendants spent significant time talking about the increased communication between them and the formal healthcare system. They expressed appreciation for being able to communicate with the health posts or the community when needed.

*“Nos escucha pues cuando llamamos. Me siento segura que, sí, me apoyan en eso.”*

(“He listens to us when we call. I feel sure that, yes, they support me in that.”)  
–CHL talking about her mentor.

Often this increased interaction was made possible by both parties having the phone number of a person who could find patients in the community or the number of a person who could send an ambulance if needed.

*“Cualquier cosa llamo al doctor, de cosa que tenemos [en la comunidad], de que cosas que pueden hacer por nosotros. Entonces todo eso podemos platicar... Con ese doctor siempre es confiable, que me ha ayudado bastante. El director me tiene mucho apoyo.”*

(“Anything I call the doctor, about things that we have [in the community], about things that they can do for us. So we are able to chat about all of that... With that doctor he is always trustworthy, he has helped me quite a bit. The director gives me much support.”)

- TBA discussing her relationship with the physician at her referral health post.

Due to this project, health leaders had access to phone numbers of healthcare providers with whom they had previously interacted. On multiple occasions, these new relationships led to a rapid response by SILAIS Matagalpa providers who were able to

travel to the smaller communities to assess the pregnant woman in question, convince her and her family of the importance of going to the health center, supply timely transportation to the health center, and provide appropriate care once there.

Almost all community participants, as well as their mentors, mentioned times that they worried about a patient but then were able to follow up on the patient and give appropriate care because of more open and direct communication between project participants than previously existed.

The community health leaders tell stories of pregnant women who they were worried about and unable to convince to go in to the health center. The following is one case example of the two parties working together to convince a woman with a difficult pregnancy to deliver at the health center:

*“Había una mujer que no bajaba. Tenía cinco días después de su fecha de parto; le visitaba 4 días en seguido para decirle que baja. Ella estaba de acuerdo, pero el que no quería era su marido. Entonces, como para mi era difícil, yo hable con el director, le dije ‘mire, tengo tres [mujeres embarazadas] que han ido a la casa materna, pero tengo una que no quiere [ir] y ya esta a su fecha probable de parto. Entonces mandó al director del puesto de salud, quien es el responsable de las embarazadas. Llegaron, les plante todo como era y fueron donde ella. El director dijo que le iba a buscar con policía y todo si no viniera porque ya se inflamaba [la cara], ya iba complicado. Por fin le trajo y estaba bien complicada y le trasladó a Matagalpa.... Ahora ya se siente como que se llegó razón, de que si se hubiera quedado allí, hubiera muerto su bebe. Ahora la mamá de ella se siente bien [mama de la embarazada]. Al principio la mamá había dado la culpa a mi por haberle mandado por aquí. Pero le dije que eso era mi trabajo. Ahora, ella misma ve como quedó bien para su hija y el bebe, ahora esta de acuerdo con lo que hice yo.*

*El doctor – ‘el marido dijo que no quería que le tocara [a la embarazada] ni un doctor, entonces si no quiere que le toque, que vámonos. Ud. baje con ella para que mire lo que vamos a hacer.’ Le trajo a ella con el marido. El marido le acompañó hasta Matagalpa.”*

(“There was a woman who didn’t come in. She was five days after her expected delivery date; I visited her four days in a row to tell her to come in. She was in agreement, but her husband was the one who didn’t want her to. Since it was difficult for me, I talked with the director and I told him, ‘look, I have three

[pregnant women] who have gone to the casa materna, but I have one who doesn't want to [go] and she's already at her expected delivery date.' So, he sent the director of the health post, who is responsible for the pregnant women. They arrived, I told them how things were and they went to her place. The director said that they would look for him with the police and everything if she didn't come because she was already swollen [her face], she already had complications. Finally they brought her and it was very complicated and they transferred her to Matagalpa... Now she feels like she came around to the right choice, that if she had stayed there, her baby would have died. Now the mom of that woman feels good about it [mother of the pregnant woman]. At the beginning, the mom blamed me for having sent her here. But I told her that that was my job. Now, even she sees how it worked out well for her daughter and the baby; now she is in agreement with what I did.

The doctor – 'the husband said that he didn't want anyone to touch her [the pregnant woman], not even a doctor, so if he didn't want any one to touch, then let's go. You come down with her so that you can see what we are going to do.' They brought her with her husband. The husband accompanied her all the way to Matagalpa.”)

– TBA describing a particularly difficult situation where she found great support from the SILAIS Matagalpa healthcare providers

### **Effects on participants' practices**

Except for two participants, all of the community health leaders had participated in previous trainings either through SILAIS Matagalpa or from private organizations. It was mentioned that this was the first time for most of the participants that the material was covered on multiple occasions. One woman stated that she did not understand the material during the initial week of training and that it was still unclear after a follow up meeting. However, she has had the opportunity to continue to review it with her mentor and feels that she has begun to master the material. Participants cited the follow-up meetings with mentors as the reason they have retained the information they learned during the initial training.

Community health leaders and TBAs made reference to multiple ways in which patient care in their communities has changed since initiation of the DPSV Project. Most frequently mentioned was the increase in home visits prior to delivery.

*“Siempre voy andando visitando la embarazada. Que significa hacer su control, como se esta alimentado, si se esta tomando el acido fólico... todo eso pregunto a ella”*

(“I’m always walking around visiting pregnant women. What it means to do their prenatal control, how they are eating, if they are taking their folic acid ... all of that I ask her”)

– TBA regarding her prenatal home visits

The TBAs who had traditionally delivered babies in their community often only visited the woman for the delivery once the woman was experiencing labor pains and perhaps once after the delivery. Visiting the woman beforehand to give advice about prenatal care and location of delivery has greatly increased their contact with the pregnant women in their community.

### **Role at labor & delivery**

The traditional birth attendants stated that they are no longer attending deliveries in their communities, except in emergency situations. They are officially allowed to attend deliveries at health centers under the supervision of SILAIS Matagalpa health personnel, however few are doing this.

*“Dicen que los partos no son iguales, que ahora se complican las cosas”*  
(“They say that deliveries are not all the same, that now things are more complicated”)

– TBA discussing that same meeting

*“Hay mas peligro ahora en el parto – porque en la juventud has mas debilidad. Antes las mujeres eran valerosas. Antes yo les hacia todo, sacaba el niño, yo mismo cortaba el cordón. Pero ahora, mucho riesgo.”*

(“There is more danger now in labor – because there is more weakness in young people. Before, women were brave. Before, I did everything, I took the baby out, I cut the cord myself. But now, much risk”)

- TBA discussing how and why labor is different now for women.

Many of the TBAs echoed this sentiment with very similar wording. They described the labor and delivery process as more difficult and dangerous than it was previously. They stated that this increased likelihood of bad outcomes was the reason for women needing to be encouraged to go into the Casa Materna early and to deliver at a health center or post.

### **Role within SILAIS**

Participants stated that they now feel as if they are an active part of SILAIS Matagalpa. This has happened both in their communities, where they have been introduced to the community by SILAIS Matagalpa officials as the contact person for the health posts, as well as in the health posts and health centers. The participants felt that they were welcomed when they arrived at their health posts and centers with pregnant women because the healthcare staff knew who they were. They were also afforded greater access to accompany patients during delivery.

### **Literacy**

The participants with literacy difficulties were frequently embarrassed by their inability to fill in their workbooks. They also had difficulty admitting to the interviewer that they had trouble doing calculations that they were expected to do such as expected

delivery date and number of weeks of gestation of a pregnant woman. Each of the participants with low levels of literacy had found a person in the community to help them. This person varied from a daughter who accompanied a TBA to all trainings and most home visits to record notes, to a neighbor who filled in names of pregnant women but did not help with other activities.

*“He pensado alfabetizarme. Mi hijo me regaló un par de anteojos pero todavía no veo bien”*

(I have thought of learning how to read. My son gave me a pair of glasses, but I don't see well.)

- TBA who had not completed primary school and also needed reading glasses

*“La hija se me lo llena [el libro] y ella fue conmigo, acompañadme hasta Matagalpa una vez.”*

(My daughter fills it [the book] out for me and she went with me, accompanying me to Matagalpa one time.)

- TBA whose daughter has helped her with literacy issues

A few health leaders and TBAs expressed difficulty in taking blood pressure measurements, specifically mentioning the complexity of rapidly reading and remembering numbers. Therefore, they were not taking blood pressures at home visits. It was stated that some also were having difficulty with measuring the height of the uterine fundus. In contrast, only two TBAs expressed any reservations in their ability to attend a delivery if the need were to arise in an emergency situation.

### **Logistical difficulties with mentor/participant meetings**

The participants and mentors who had been able to meet either at the health post or out in the community were happy with the visits. Unfortunately, many participants stated that their mentor had been unable to meet them in their community even once.

*“En algunas comunidades hemos tenido problema en el acompañamiento. Ellos [el participante] bajan al municipio o al centro de salud, al puesto, pero muchos de los mentores no bajaron a la comunidad a apoyar a ellos, ellos han sido bastante.” -*

(In some communities we have had trouble with the accompaniment. They [the participant] come in to the municipality or health center, to the health post, but many of the mentors did not go to the community to support them; there are many who are in that situation.)

– SILAIS Matagalpa director of nursing

Multiple participants reported that they had gone in to the health post or center to meet with their mentor and that the mentor was not there. This happened to one participant three times before she was able to find someone to shadow on the fourth visit.

### **Equipment resources**

Both mentors and participants mentioned specific equipment that would facilitate their work. For participants this was often medication that they would like to have ready access to in their community or materials for suturing or other emergency situations.

*“La falta mas grande es de medicamentos, quiero tener un botiquín mejor equipado”*

(The biggest thing that we are missing are medications; I want to have a better-supplied medicine chest)

– Community Health Leader

### **Mentors**

#### **Communication with participants & connections to community**

The mentors feel that they are receiving more detailed information now about pregnant women because of increased home visits conducted by the participants. A few of the mentor/health leader pairs described talking about who was pregnant in the

community and comparing lists. In doing so, both sides were able to find women that were either not going to the health post for formal prenatal visits or testing or who had not received a home visit from the health leader. This exchange of information also allowed both parties to be aware of when pregnant women were due and any concerns either party had about a particular woman.

Many mentors feel that within the first year of the project, there are now areas that they worry much about less, former “*zonas calientes*” (hot zones) as one mentor called them.

*“No, ya no, nosotros hicimos una reunión allí en el puesto y decimos que ahora no pueden atender, que bajen a la casa materna, al centro de salud”*

(“No, not now, we had a meeting there in the health post and we said that now they cannot attend deliveries, that they come down to the casa materna, to the health center.”)

- Mentor regarding the meeting at which TBAs were informed that they are to bring pregnant women to health centers for deliveries

The mentors expressed similar wording to that spoken by the participants about the importance of TBAs no longer doing deliveries in their communities. However, they recognize that many of these women have delivered numerous babies and have basic skills. They were in agreement that these basic labor and delivery skills should continue to be taught to create better emergency preparedness.

*“Por si hay un parto, que ellas [las TBAs] tiene el equipo por necesidad”*

(“In case there is a delivery, they [the TBAs] have the necessary equipment.”)

- Nurse mentor on the why TBAs continue to need training and equipment to safely attend a birth

The SILAIS leadership stated that the onus for improving this communication lies with the nurses and mentors more so than the community members and that, in turn, it is the responsibility of the healthcare administration to facilitate this communication.

*“Con los de los mentores, hacer mas consciencia del importancia de este trabajo con los mentores. Los dificultades que hemos tenido con estos grupos. Una mejor comunicación, coordinación desde SILAIS, desde los municipios, de los unidades de salud, de los puestos, hasta la comunidad. Tenemos que mejor esa comunicación con el MINSA”*

(With the mentors, we have to make them more aware of the importance of this work with the mentors. The difficulties that we’ve had with these groups. better communication, coordination from SILAIS, from the municipalities, from the health units, health post to the communities. We have to have better communication with MINSA.)

– Yolanda Vallejos, Head of Nursing SILAIS Matagalpa

### **Changing experiences in the health centers**

One mentor felt that the increases in patient autonomy and respect for the patients’ wishes were partially responsible for the increased number of women delivering at the health center. Many of the mentors and other SILAIS officials stated that the communities had been selected because they were communities that caused great concern because of high numbers of home deliveries and recent histories of poor pregnancy outcomes.

*“Una gran fortaleza - entrar donde no había cobertura de MINSA”*

(A great strength - to go into areas where MINSA didn’t have coverage)

– Nurse mentor

One health center director reflected on the increased presence of the project participants at his health center:

*“Nos ha ayudado muchísimo a que nos ha aumentado el nivel de partos institucionales. Es el hecho que a la mujer [embarazada] se permite que viene acompañado hasta el momento que esta partiendo: que nos ayuda [las parteras] con las posiciones, cortar el cordón... Tratamos de que el parto sea lo mas natural posible”*

(“They have helped us a lot in that they have increased our level of institutional births. It is the fact that the [pregnant] woman is allowed to come accompanied up through the moment that she is giving birth: that they [the TBA] help us with the positions, cutting the umbilical cord... we try to make the birth be as natural as possible.”)

– Nurse mentor

Mentors assert that with the proper training, some of the TBAs would be allowed to take a more active role in the delivery room. Many think that allowing the TBAs to work in both the community and health center has specifically increased community trust, and thereby utilization, of SILAIS health facilities. Mentors verbalized that they were able to talk through patient treatment and care with their mentees repeatedly. This led to a feeling of increased trust of the mentors and other SILAIS Matagalpa healthcare providers of these particular community health leaders, as compared to other health leaders working with SILAIS Matagalpa but not participating in this particular project.

### **Program Improvements and Scale Up**

Two mentors mentioned working with participants to fill out the workbook with them during meetings at health posts. One mentor expressed concern that the information from the workbook was duplicating other SILAIS recordkeeping.

Every mentor and SILAIS employee interviewed discussed their desire to expand this project to other communities in their coverage area. Other health centers had heard about this current project. Health center directors have specifically asked the director of

SILAIS Matagalpa about when their municipality will be able to participate in this project.

*“La manera que va a funcionar es que metamos mas parteras [tradicionales] para que todos sepan que el parto institucional es importante. Que ellas puedan llevar a la embarazada al parir al unidad de salud y que ellas puedan atender al parto. Y ya después el parto acompañado y todo eso. Y que todos den se tecito a la embarazada y su comidita durante el parto.”*

(“The way that this will work is that we involve more [traditional] midwives so that they know that institutional births are important. That they are able to take the pregnant woman into the health center to deliver and that they can perform the delivery. And then they accompany the birth and all of that and then everyone gets to give their tea and food to the pregnant woman during the labor.”)

–Dr. Erasmo Jarquin, Director of SILAIS Matagalpa

*“El otro me decía, con le jefa del municipio – [tiene 4 municipios adentro del proyecto] ‘y a nosotros, cuando nos va a integrar?’ Nos faltan 10, es un proceso, este es un proyecto piloto, estamos viendo resultados, vamos a ir integrando los otros municipios”*

(“The other person told me, with the municipal boss [there are 4 municipalities within the project], ‘when are you going to involve us?’ We are still missing 10; it’s a process; this is a pilot project; we are seeing results; we will go along integrating other municipalities.”)

- Director of participating health center

The other health directors have heard that it has been easier for participating municipalities to track their pregnant woman and that they have had an increase in utilization of services at all stages of pregnancy care.

As one of the nurses pointed out when talking about requests from participants for more equipment, the nurses are also missing basic equipment. One nurse noted that the project participants now have blood pressure cuffs for use in the community and she herself does not have one.

## **Discussion**

### **Knowledge gained**

Intense multi-day training programs have been shown to increase participant knowledge in advising pregnant women and to improve the clinical skills necessary for a safe childbirth (2, 6, 32-34). In Matagalpa, it was expected that by following training modules that had been proven effective in the past, the initial week of training would provide community health leaders and traditional birth attendants with a stronger knowledge base than they had previously. The focus of this training was for participants to comprehend the importance of prenatal visits, utilization of the Casa Materna, and institutional delivery. Additionally, participants were trained to reinforce important health messages in home visits to pregnant women, women in the postpartum period, and neonates. It was encouraging that the participants in this program showed similar gains in knowledge regarding appropriate prenatal care and safe deliveries. The increase in average test score from 59% to 79% represents a short-term increase in understanding of prenatal and birth practices. At the interviews one year after the initial trainings, the participants continued to use this knowledge on a regular basis, and both they and their mentors felt that this knowledge had led to new practices of patient care.

### **Prenatal Visits**

One project goal was to strengthen current ministry of health efforts in maternal health. MINSA has the national goal that each pregnant woman attends at least four prenatal visits. This has been shown to be the minimum number of visits to complete a basic package of prenatal testing, monitoring and education (1, 35, 36). Anecdotally, the

majority of women in the participating communities are now reaching this goal. Unfortunately, due to problems in record keeping, we were unable to evaluate the true number of prenatal visits attended by women in these communities who had already delivered. It is also likely that even the anecdotal number of prenatal visits accounted for verbally has been inflated to reflect participants' interest in providing the information that the project desired. Participants frequently commented that the women in their community were accessing prenatal services at health posts or health centers far more frequently than what was recorded in the workbooks. The participants verbally reported that most of the pregnant women in their communities were going to health posts for at least 4 prenatal visits. The verbal reports more closely match the department level trends of 79% of women attending 4 prenatal visits (16). According to the workbooks, 26% of women were reaching this goal. This is an area that will be worth exploring more as the data collection system becomes more accurate.

### **Labor, Delivery & the role of TBAs**

As the participants live in remote areas that are difficult to access in emergency situations, it was deemed important to teach the basics of how to safely attend a delivery. This was controversial as there is a large national effort to encourage traditional birth attendants to give up their practice. As the 10 deliveries performed by the TBAs shows, even with increased institutional births, this is a critical area of training for patient safety. Many TBAs expressed their understanding that they are no longer to attend deliveries. The manner in which this has been explained to them led many to comment that deliveries were more dangerous, more complicated and somehow less safe than they were

even ten years ago. This view of deliveries being “less safe” is in direct contradiction to the official epidemiological data that shows a drastic decline in maternal mortality and morbidity over the last twenty years. A few of the TBAs proudly stated that none of the women whom they had delivered had died. Maternal death is the extreme end of bad maternal outcomes; the TBAs were less able to tell, however, how many women had suffered from hemorrhage or other morbidities. Additionally, the use of almost identical wording among the TBAs (despite being interviewed individually at separate health posts) makes it likely that the TBAs are repeating phrases they have been told by the ministry of health, and expected that the interviewer wished to hear.

This unintentional understanding of the increased danger of delivery is not necessarily harmful, but should continue to be monitored in the future as there is worry among some healthcare providers in SILAIS that this will lead to the belief that it is the care provided by the ministry of health that is leading to more dangerous and complicated births. Another factor for TBAs believing that there are worse maternal outcomes now than when they began practicing is that they are now regularly informed about outcome data. Previously they would only have known about anecdotal cases of bad outcomes in their community and surrounding areas and not overall statistics for the entire Departmental catchment area.

Many of the TBAs involved in this project had worked as traditional birth attendants for years prior to joining DPSV. Most had delivered between 10 and 60 babies prior to this project. Three women had extensive experience: one estimated having delivered over one hundred babies, one over five hundred and a third estimated that she had delivered well over a thousand.

All of these traditional birth attendants said that before this increased training, their community role consisted of being called to the delivery once the woman's labor had begun. They reported rarely doing prenatal visits; however they often knew who was pregnant and they would be called on if the pregnant woman had questions.

SILAIS calls the TBA's *parteras/consejeras* (midwife/counselors) to reflect the changing role that they are asked to take in their community. Every one of the participants who had previously functioned as a TBA in their community, described herself with the name *partera/consejera* to the interviewer. When asked about how this project changed their work, they articulated the expanded role of home visits and community health talks that they had not previously undertaken. Although not one of the TBAs expressed explicitly that they missed doing deliveries or disparaged SILAIS for changing how they had been working for their entire career, it is hard to tell if this was simply because the interviewer was perceived as a part of the project and SILAIS. The woman who had performed over a thousand deliveries mentioned that she was happy to rest now, knowing that the women in her community were safely being taken care of by SILAIS providers. The faces of a few of the women lit up when talking about past deliveries and about the small number of emergent deliveries they facilitated. The younger TBAs who had performed fewer deliveries did not appear to have this sentimental attachment to their role during labor and delivery. As this was not the primary focus of the interviews, more specific information was not gathered on the subject. It would be greatly beneficial to examine more deeply how these roles are changing.

The pregnant women who interacted with program participants during their prenatal care had an incredibly high rate of delivering at an institution (93%). This was much higher than the average rate for the Department of Matagalpa (81%), which includes an already nearly universal institutional delivery rate within the city of Matagalpa. Comparable rural areas in Matagalpa continued to have institutional birth rates between 60% and 75% (16).

In light of the low literacy levels of project participants, the percentage of institutional births is the simplest piece of data collection that had been requested and was emphasized as the most important. This information is, therefore, likely to be more reliable than the data collected on number of prenatal visits or home visits. Delivery at an institution has been shown to lead to better maternal and neonatal outcomes, due to the greater human and equipment resources available (37-39). Once women have been convinced to deliver at an institution where emergency obstetric services are available, the quality of care delivered at that facility is inversely proportional to the maternal and infant mortality rates (40).

As the TBAs and CHLs are invited into the hospital with laboring women, even when they themselves also just arrived from a long, muddy trip, they are able to take on a support role for the pregnant woman. The hospital officials describe that it has been helpful to have the program participants at the delivery to help hold the woman and comfort her. This puts the TBA in the middle of the delivery and, as they have been instructed in the expectations for a “humanized birth” according to the *Humanización del Parto* program, they are able to ensure that hospital staff is treating the laboring woman in a respectful manner.

## **Other activities**

The TBAs and CHLs are now more actively involved in other areas of community health. They expressed pride in conducting health talks for their community. This may provide an opportunity for discussing sensitive topics best led by a known member of the community. For example, one young woman described leading a discussion among a small number of women about domestic violence. Having shown that she could lead such a sensitive discussion despite her young age, she saw an immediate increase in her being asked for advice and to lead other talks. By preparing the TBAs and CHLs to discuss a wide variety health topics, the DPSV project is facilitating their ability to be an information bridge between the formal health sector and the local community.

Many of the participants had previously volunteered as community health leaders with the ministry of health and this project has led to additional responsibilities. This increased work, so far, has been described in a positive light. The greater communication with community members through home visits and talks means that they have a deeper understanding of the current health issues in their respective communities.

The TBAs and CHLs are performing multiple home visits to most of the pregnant women during their prenatal care and average at least one postpartum visit per woman. The discrepancy between the number of postpartum visits and newborn visits could either be a reflection of poor record keeping or a misunderstanding by the participants of the importance of checking on both mother and baby at each home visit.

## **Changes in health system practices**

The changes in patient behavior in these communities have been in the context of many other interventions at the national level. These other interventions include increased provision of equipment and other resources in the health centers, more ambulances and the utilizations of maternal waiting houses, among others. The use of *Casa Maternas*, has been highlighted as a way to increase institutional deliveries, but they have not been directly shown to directly improve maternal outcomes (40, 41). For the furthest communities participating in the project, the Casa Materna may be the only reasonable way for women to be close enough to the health center at the time of delivery.

As the DPSV project is able to offer support in the areas of exchange of ideas and information to achieve the goals of better reproductive care, SILAIS officials have reason to be supportive of this project. The increased assistance in reaching goals has led to interest in project participation. The WHO recently recognized the Nicaraguan ministry of health for its significant improvements in maternal health (42). They specifically cited working with community members and the *Casa Materna* as keys to this success. The DPSV project is one way for MINSA to reach more at-risk women, as many of the SILAIS officials acknowledged in their interviews. The participants in the DPSV project are more actively communicating with health posts and centers and helping women access necessary care than are their counterparts who are not a part of this project. This is in part because they are receiving more frequent training. Another motivating factor is an increased feeling that they are a part of the formal health sector, primarily as a result of regular contact with mentors (nurses) and physicians, as well as the motivation resulting from the respect they are afforded.

## **Building trust**

The general consensus from both mentors and community members is that the increased communication between the two groups had been an invaluable addition to the care of pregnant women. This often stemmed from simply knowing who the other person was. The fact that they had previously met the other person thus allowed TBAs and CHLs to call on SILAIS health staff in emergency situations. In these emergencies, nurses could now trust that if a participant called and said that it was an emergency that it was more likely to be a true emergency, and that the health post needed to respond.

Many of the TBAs and CHLs reported they now felt welcome in the health centers when they visited, either by themselves or with a patient. This is most likely from having been previously introduced to health center staff as a member of the health care team. They were allowed to accompany the pregnant women, even when the TBA herself reported arriving in sandals and covered in mud from her journey to the health center. The first step toward TBAs eventually delivering babies at the health posts is for them to be allowed in with laboring patients at all. Officially, MINSA states that known TBAs may perform uncomplicated deliveries under physician supervision. Only one of the TBAs from the project has attended a birth at a health center. This woman was previously well known to health center staff. This is an example of the incremental process that first, the project participants and formal healthcare sector personnel must meet each other. They must then interact enough to allow the TBA to accompany a laboring woman and finally trust her capacity as a midwife enough to allow her to perform the delivery in the institution.

Once MINSA has come closer to their goal of 100% institutional births, the next step will be to focus on improving the quality of care delivered in health centers and hospitals. This is already being implemented with the *Humanización del Parto* program. It is important not just to train TBAs but also to sensitize hospital staff to provide better patient care and to show respect for TBAs, which is likely to lead to better health outcomes (43). In this project, we have seen that many health center nurses believe that it has become easier to convince women to deliver at their center as more women have had acceptable deliveries and told other women in their community. The community participants and mentors are in agreement that it has become easier to convince women to deliver at the health center because they feel that they can honestly tell pregnant women that they will be treated respectfully. The TBAs and CHLs have heard from women that they were treated well and most of them have seen SILAIS nurses and physicians caring for patients in a respectful manner. By virtue of the TBAs and CHLs being present during delivery, it is likely that SILAIS nurses and physicians are more careful to follow the guidelines for a better birth: more careful to follow the patients wishes, to allow her to eat the food that she wants to eat, and to permit someone (especially if it is a project participant) to remain in the room with her during labor and delivery.

The feeling of empowerment of the participants is palpable during the interviews and was noted by mentors and other SILAIS officials working with them. Many remarked that the participants appeared to speak to nurses with more confidence. When they called to report a patient, they spoke of knowing that if they were asking for help, they would be taken seriously. There was a feeling that the clinical judgment of the participants was valuable and accurate. Participants spoke to the sensation of garnering

greater respect among their fellow community members because of the relationship that the community saw between the TBA or CHL and SILAIS health officials. This reciprocal trust and respect between the participants and their SILAIS mentors appears to be key to the increase in communication.

### **Limitations of the Project: Literacy**

Many of the DPSV project participants had great difficulty documenting activities performed in their workbooks. When the DPSV project was initiated, the project coordinator was told that all of the community participants were literate. This was not verified before initiation of training. The variable levels of literacy and math ability were significant barriers to participants correctly recording information in their workbooks. Those participants with higher levels of education (at least primary school) were able to fill in the details of the workbooks with minimal difficulty. Those women who could not read or write more than their name had the most difficulty. Although most of these participants found someone to help with the information that needed to be recorded, this was only marginally effective. In one case, a woman was able to have her literate daughter accompany her to all of the trainings and the majority of the home visits. This allowed for real-time data recording.

The participants had been asked about their reading abilities; however even those with an education beyond primary school had difficulty with the math portions of the data collection. This included reading blood pressure. One woman remarked that it was simply too much to try to operate the blood pressure cuff at the same time as she was trying to read and remember numbers. This particular participant needed to slowly think through

what written numbers meant. Many of the participants found it difficult that some thermometers were in Centigrade or Fahrenheit and they were unsure which the nurses were looking for. Although the participants were asked to record which week gestation the woman was at when she received a home visit, this was too difficult for any of the participants to calculate. For some this was because they did not always have a pregnancy wheel with them. For others, even with the pregnancy wheel and a bit of practice, it was still too confusing to be done rapidly enough during a home visit.

The majority of the participants had never had their vision checked. After it was noted that more than one was complaining that they could not read the print that notes were being taken on, the participants were brought for vision screenings during a follow-up training. Glasses were ordered through the ministry of health but as of the time of this evaluation had not yet been delivered.

### **Logistical challenges**

We were unable to meet with all active participants due to difficulty in cell phone connections that would have advised participants of meeting times and not all participants were able to travel the long distances and make extra time to meet for the evaluation. This difficulty in travel (flooded rivers, multi-hour walks on mud paths during the rainy season) was also a contributing factor to the low number of meetings between mentors and participants, as well as TBA/CHL participation in an internship day. Often when these were scheduled, the participant was physically unable to arrive on the scheduled day. Other difficulties include being unable to contact the participant by telephone (many use a cell phone borrowed from another community member). Many of the participants

described arriving at the health post only to find that their mentor was not there. The mentors say that on those days they had to attend other meetings or trainings and that these other obligations interfered with the meeting or internship time with the participant.

The participants who were interviewed, and whose workbooks were tallied, were not necessarily representative of all project participants. The participants who did not attend the meetings were either unable to be contacted due to poor phone communication or had difficulty with transportation. It is likely that those who were able to make it to their health post for the monthly meeting at which the interviews were conducted are more involved with activities and have a more positive relationship with their mentors than those who did not attend the meetings. This could be because they are able to communicate more easily with their health post. Also, the participants who arrived to the meetings are more likely to be able to travel to meet with their mentors as demonstrated by their presence at the meetings. A few of those who did not arrive stated specifically that they had difficulty crossing rivers to get out of their communities. This same geographical barrier would act as a barrier to participants regularly shadowing their mentors and also create greater difficulty in getting pregnant women to health care resources.

We were unable to cross-compare delivery location of individual patients between participant workbooks and SILAIS patient files. Therefore, we worked under the assumption that data collection by participants was accurate and not inflated to reflect the known expectation that they were supposed to be bringing women in to health centers to deliver.

This evaluation is not meant to be generalizable to areas outside of the study Department of Matagalpa. Although there may be several similarities between this project and other traditional birth attendant training programs in rural, underserved areas, this evaluation merely shows where this specific project has succeeded and where it can be improved.

### **Sustainability**

The DPSV project is a package of support to SILAIS Matagalpa and their multiple projects to improve health outcomes of pregnant women and children. To that end, this project is not meant to be a permanent part of the SILAIS Matagalpa maternal and child health program. When members of SILAIS Matagalpa were asked what would be necessary to continue this project, the response was always related to funding. This project, like many conducted by SILAIS Matagalpa, is financed by an outside organization. In an area where funding for health is limited to less than \$15/person/year, there is reason to be selective about which new projects are undertaken. The head of nursing for SILAIS did speculate about other funding sources that could be brought in. Her first reaction was to look for a new outside funding organization, then she talked about finding a way for the TBAs and CHLs to make money from the work they are doing.

By providing increased teaching, support of pregnant women, and a communication line, the DPSV project has been able to augment the MINSAs programs already in place to strengthen relationships with community health leaders.

## Conclusions

In evaluating the *Destrezas Para Salvar Vidas* project, we found that the innovative package of training and mentoring led to an improved knowledge of life-saving skills and increased referrals to health centers for prenatal care and deliveries. The initial week of training successfully increased the participants' scores on a test of medical knowledge related to pregnancy, from an average score of 59.5% to 79.9% (differences 21.4%,  $p < 0.001$ ). The participants did an excellent job of referring pregnant women to the *Casa Materna* and health posts, thus leading to an increased institutional birth rate (93%) compared with the departmental average (81%), despite being in some of the most difficult to reach areas, and that had been anecdotally the sites of many bad maternal outcomes in recent years. Other data recording was weak, in part due to literacy limitations of the participants. Examining the written record, it would appear that significantly fewer of the pregnant women (26%) in the catchment area attended at least 4 prenatal care visits than the average for the department (79%). This is an indicator of poor record keeping. The project participants conducted an impressive number of home visits: 936 total visits were recorded and an unknown additional number went unrecorded. This and the more than 60 health education talks demonstrate the excellent outreach the participants are having in their communities.

This increase in institutional births is likely due in part to the increased communication and trust between community leaders and SILAIS Matagalpa health personnel, allowing the community leaders to be an effective bridge between patients in the community and the formal health sector. The project did an excellent job in

introducing the various parties to one another and creating the opportunity for meaningful, reciprocal teaching and exchange of ideas. This worked well to augment emergency services to these communities through more direct communication with the health posts. The familiarity with their communities and health posts allowed TBAs to be cultural brokers for their patients within the formal healthcare system.

There is great enthusiasm for this project and the results it has brought about. However, when asked about what would happen after this funding source ran out, none of the members of the formal health sector had thought about where to find the monetary funds to continue the project. If the ministry of health would like for this project to continue they will have to find alternate funding sources. Ideally this project would become part of the regular budget for maternal health projects.

## **Recommendations**

The DPSV project continues as this paper is being written. If the project were to expand, as hoped, to include more participants and communities, a number of changes should be implemented. This project expansion should include both community health leaders and traditional birth attendants from new communities in the currently participating municipalities as well as the inclusion of more municipalities. The next group of twenty participants is to come from the municipalities of Rancho Grande, Waslala, Matiguas, Río Blanco, and La Dalia.

## **Participants**

SIL AIS officials request that the participants be people who have been previously identified and volunteered in the role of community leader, preferably in the area of health. Greater focus should be placed on community health leader and traditional birth attendant literacy. This could take two forms. The first is to try to recruit only those who have completed a minimum of a primary education and have the concomitant literacy skills. The second is to enroll current and potential participants in government-sponsored literacy projects that are expanded to include other rural communities.

Participants should combine post-partum and newborn home visits. As they are likely seeing both mother and baby at the same visit, this double interaction needs to be recorded as such, and both parties' health concerns should be addressed.

### **Mentors**

New mentors should be people who already participate in this type of work and who want to be more involved in community health. The nursing coordinator should emphasize with health post and center directors the importance of this work to larger SIL AIS maternal health goals. Directors should allow time for mentors to complete community visits and meetings with community health leaders. The majority of mentors were sufficiently motivated to fulfill their responsibilities to this project but often found it difficult to find time among their existing responsibilities. As this is a portion of their work responsibilities, mentors should be held accountable for their work within this project as part of their employment evaluations with SIL AIS.

Many of the mentors also had to use their own funds to pay for bus fare or gasoline to visit their mentees out in the community. If the project pays for participant travel, it should also pay for mentor travel that is project related.

### **Data collection**

The data collection system did not work well for illiterate and low-literacy participants. This system is being revised with the help of Yolanda Vallejos, the head of nursing for SILAIS Matagalpa. The information collected should closely match that needed by SILAIS Matagalpa and then could be used for current epidemiological data collection. The data collection system will be reviewed by mentors at a SILAIS Matagalpa meeting and be piloted by 9 mentor/participant pairs of varying characteristics before being rolled out to the entire group. Mentors should help participants at their regularly scheduled meetings to keep records updated and answer any questions about data recording as they arise.

The coordinators of the DPSV project should address the specific areas of clinical weakness through increased shadowing of mentors by community health leaders and traditional birth attendants. Many TBAs and CHLs were unable to participate in the internship days this year, largely because of timing conflicts for mentors. It is the mentor's responsibility to ensure that the internship is set up for a time that works for both health post staff and the participant.

## **Sustainability**

For these practices to continue after the life of the funding source, these activities will have to be integrated into the larger program of maternal services that SILAIS already provides for women of the Department of Matagalpa. All of the positive work that is being achieved by the people working on this project to improve the health of women in their community will be diminished greatly if those who would be working in this area over the next many years do not find a more sustainable source of funding. This evaluation has shown that the *Destrezas para Salvar Vidas* was able to bring a positive change to maternal health in some of the geographically hardest to reach areas of the Department of Matagalpa. Overall, this project models an effective way for SILAIS Matagalpa to extend its community outreach and continue to improve the health of women and their communities.

## References

1. A. B. Suleiman, A. Mathews, R. Jegasothy, R. Ali, N. Kandiah, A strategy for reducing maternal mortality. *Bull World Health Organ* **77**, 190-193 (1999).
2. L. M. Sibley, T. A. Sipe, D. Barry, Traditional birth attendant training for improving health behaviours and pregnancy outcomes. *Cochrane Database Syst Rev* **8**, CD005460 (2012)10.1002/14651858.CD005460.pub3).
3. G. L. Darmstadt, A. C. Lee, S. Cousens, L. Sibley, Z. A. Bhutta, F. Donnay, D. Osrin, A. Bang, V. Kumar, S. N. Wall, A. Baqui, J. E. Lawn, 60 Million non-facility births: who can deliver in community settings to reduce intrapartum-related deaths? *Int J Gynaecol Obstet* **107 Suppl 1**, S89-112 (2009).
4. L. M. Sibley, T. A. Sipe, Transition to skilled birth attendance: is there a future role for trained traditional birth attendants? *J Health Popul Nutr* **24**, 472-478 (2006).
5. L. M. Sibley, T. A. Sipe, M. Koblinsky, Does traditional birth attendant training increase use of antenatal care? A review of the evidence. *J Midwifery Womens Health* **49**, 298-305 (2004).
6. L. Sibley, T. Ann Sipe, What can a meta-analysis tell us about traditional birth attendant training and pregnancy outcomes? *Midwifery* **20**, 51-60 (2004).
7. C. AbouZahr, T. Wardlaw, C. Stanton, K. Hill, Maternal mortality. *World Health Stat Q* **49**, 77-87 (1996).
8. C. Ronsmans, W. J. Graham, L. M. S. S. s. group, Maternal mortality: who, when, where, and why. *Lancet* **368**, 1189-1200 (2006).

9. C. AbouZahr, T. Wardlaw, Maternal mortality at the end of a decade: signs of progress? *Bull World Health Organ* **79**, 561-568 (2001).
10. M. C. Hogan, K. J. Foreman, M. Naghavi, S. Y. Ahn, M. Wang, S. M. Makela, A. D. Lopez, R. Lozano, C. J. Murray, Maternal mortality for 181 countries, 1980-2008: a systematic analysis of progress towards Millennium Development Goal 5. *Lancet* **375**, 1609-1623 (2010).
11. Nicaragua 1998: results from the Demographic and Health Survey. *Stud Fam Plann* **31**, 178-182 (2000).
12. Z. A. Bhutta, M. Chopra, H. Axelson, P. Berman, T. Boerma, J. Bryce, F. Bustreo, E. Cavagnero, G. Cometto, B. Daelmans, A. de Francisco, H. Fogstad, N. Gupta, L. Laski, J. Lawn, B. Maliqi, E. Mason, C. Pitt, J. Requejo, A. Starrs, C. G. Victora, T. Wardlaw, Countdown to 2015 decade report (2000-10): taking stock of maternal, newborn, and child survival. *Lancet* **375**, 2032-2044 (2010).
13. S. Matagalpa. (Matagalpa, Nicaragua, 2012).
14. L. A. Lubbock, R. B. Stephenson, Utilization of maternal health care services in the department of Matagalpa, Nicaragua. *Rev Panam Salud Publica* **24**, 75-84 (2008).
15. K. Hill, B. L. Queiroz, L. Wong, J. Plata, F. Del Popolo, J. Rosales, C. Stanton, Estimating pregnancy-related mortality from census data: experience in Latin America. *Bull World Health Organ* **87**, 288-295 (2009).
16. S. Matagalpa. (Matagalpa, Nicaragua, 2012).
17. Z. S. Lassi, B. A. Haider, Z. A. Bhutta, Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving

- neonatal outcomes. *Cochrane Database Syst Rev*, CD007754 (2010)10.1002/14651858.CD007754.pub2).
18. M. Cavalleru, M. Quintana, A. Ara, Analysis of maternal mortality in Nicaragua. *Newsl Womens Glob Netw Reprod Rights*, 22 (1992).
  19. E. United Nations. Department of International, D. Social Affairs. Population, U. United Nations Fund for Population Activities, Nicaragua. *Popul Policy Compend*, 1-6 (1985).
  20. S. G. Ministerio de Salud; Studebaker, D.:. (Matagalpa, Nicaragua, 2010).
  21. W. H. Guilford, K. E. Downs, T. J. Royce, Knowledge of prenatal health care among Costa Rican and Panamanian women. *Rev Panam Salud Publica* **23**, 369-376 (2008).
  22. H. E. Onah, L. C. Ikeako, G. C. Iloabachie, Factors associated with the use of maternity services in Enugu, southeastern Nigeria. *Soc Sci Med* **63**, 1870-1878 (2006).
  23. M. e. C. Herrera Torres, J. L. Cruz Burguete, G. P. Robledo Hernández, G. Montoya Gómez, [The household economy: a determinant of maternal death among indigenous women in Chiapas, Mexico]. *Rev Panam Salud Publica* **19**, 69-78 (2006).
  24. K. E. Otis, J. A. Brett, Barriers to hospital births: why do many Bolivian women give birth at home? *Rev Panam Salud Publica* **24**, 46-53 (2008).
  25. K. M. Osubor, A. O. Fatusi, J. C. Chiwuzie, Maternal health-seeking behavior and associated factors in a rural Nigerian community. *Matern Child Health J* **10**, 159-169 (2006).

26. A. García Prado, R. Cortez, Maternity waiting homes and institutional birth in Nicaragua: policy options and strategic implications. *Int J Health Plann Manage* **27**, 150-166 (2012).
27. D. Rattner, *Humanizacion en la atencion a los embarazos y partos: Breve referencial teorico.*, (Brazil, 2009), pp. 595-602.
28. E. A. Scholl, An assessment of community health workers in Nicaragua. *Soc Sci Med* **20**, 207-214 (1985).
29. D. Granada, S. Studebaker. (2011).
30. I. N. d. E. y. Censos, "VIII Censo de Poblacion y IV de Vivienda," (2005).
31. S. Matagalpa. (Ministerio de Salud, Magalapa, Nicaragua, 2010).
32. S. A. Harvey, Y. C. Blandón, A. McCaw-Binns, I. Sandino, L. Urbina, C. Rodríguez, I. Gómez, P. Ayabaca, S. Djibrina, N. M. a. N. H. Q. I. Group, Are skilled birth attendants really skilled? A measurement method, some disturbing results and a potential way forward. *Bull World Health Organ* **85**, 783-790 (2007).
33. A. H. Jokhio, H. R. Winter, K. K. Cheng, An intervention involving traditional birth attendants and perinatal and maternal mortality in Pakistan. *N Engl J Med* **352**, 2091-2099 (2005).
34. P. C. Miller, G. Rashida, Z. Tasneem, M. Haque, The effect of traditional birth attendant training on maternal and neonatal care. *Int J Gynaecol Obstet* **117**, 148-152 (2012).
35. T. Dowswell, G. Carroli, L. Duley, S. Gates, A. M. Gülmezoglu, D. Khan-Neelofur, G. G. Piaggio, Alternative versus standard packages of antenatal care

- for low-risk pregnancy. *Cochrane Database Syst Rev*, CD000934 (2010)10.1002/14651858.CD000934.pub2).
36. J. Villar, H. Ba'aqueel, G. Piaggio, P. Lumbiganon, J. Miguel Belizán, U. Farnot, Y. Al-Mazrou, G. Carroli, A. Pinol, A. Donner, A. Langer, G. Nigenda, M. Mugford, J. Fox-Rushby, G. Hutton, P. Bergsjø, L. Bakketeig, H. Berendes, J. Garcia, W. A. C. T. R. Group, WHO antenatal care randomised trial for the evaluation of a new model of routine antenatal care. *Lancet* **357**, 1551-1564 (2001).
37. D. Montagu, G. Yamey, A. Visconti, A. Harding, J. Yoong, Where do poor women in developing countries give birth? A multi-country analysis of demographic and health survey data. *PLoS One* **6**, e17155 (2011)10.1371/journal.pone.0017155).
38. T. Ensor, S. Cooper, Overcoming barriers to health service access: influencing the demand side. *Health Policy Plan* **19**, 69-79 (2004).
39. Z. A. Bhutta, G. L. Darmstadt, B. S. Hasan, R. A. Haws, Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: a review of the evidence. *Pediatrics* **115**, 519-617 (2005).
40. G. Etchegoyen, J. M. Paganini, C. I. M. P. E. d. I. I. e. Salud, [The relationship between socioeconomic factors and maternal and infant health programs in 13 Argentine provinces]. *Rev Panam Salud Publica* **21**, 223-230 (2007).
41. L. van Lonkhuijzen, J. Stekelenburg, J. van Roosmalen, Maternity waiting facilities for improving maternal and neonatal outcome in low-resource countries.

*Cochrane Database Syst Rev*, CD006759

(2009)10.1002/14651858.CD006759.pub2).

42. WHO. (2011), vol. 2013.
43. K. O'Rourke, The effect of hospital staff training on management of obstetrical patients referred by traditional birth attendants. *Int J Gynaecol Obstet* **48 Suppl**, S95-102 (1995)