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Training Evaluation Report MotherCare/Guatemala

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Executive Summary

MotherCare conducted a final evaluation for doctors, nurses, and auxiliaries of the in-service training program in June 1999. The in-service education program began in May 1997, and concluded in May 1998. The final evaluation consisted of a five-person evaluation team that collected data using six instruments to assess the knowledge skills and attitudes of a sample of providers from six hospitals. Forty-seven providers from five of the hospitals (Sololá, Totonicapán, San Marcos, Suchitepéquez, and Retalhuleu), who received MotherCare's in-service training program, were compared to twenty-five providers from a sixth hospital (Quiche), who have not yet received the training. The Quiche group served as a baseline for the evaluation.

The in-service training evaluation shows that the MotherCare training increased the confidence and ability of providers to use skills that are crucial to providing high quality maternal and newborn care. The effects of the training continue even more than two years after the completion of the training course. Trained providers are significantly better in using the partograph, performing a breech delivery, and managing postpartum hemorrhage due to atony than providers who have not yet been trained. Following the training, providers seem to be able to apply their new knowledge in the management of complications. The providers and nursing and hospital directors in their facilities report that the training has improved provider attitudes toward providing care and their early recognition and intervention of problems, as well as the provider's relationships with medical team members.

Although scores were higher in skills performance among the providers who received training, their ability to adequately manage a breech delivery and to resuscitate a newborn continues to be less than desired (percent mean scores were 46% and 57% respectively). These two skills are not frequently used but life-saving when needed. The situations where these two skills are needed are frequently unpredictable, so all providers who cover maternity need them. Frequently, immediate newborn care seems to fall outside the realm of obstetrics in some facilities, and as a result, does not get well addressed in training by obstetricians. Strategies to address this deficit need to be developed jointly between obstetric and pediatric departments in each hospital.

The providers trained in the use of the partograph reported this as one of the most useful topics in the training. While the use of the partograph is a national policy, it was not used in the hospitals in the MotherCare districts before the training and is not used in the Quiche hospital. Even within the MotherCare hospitals, the use of the partograph is not universal. The most frequent reasons given for non-use by providers were: the providers were too busy and the completion of partograph took too much time, and the doctors did not believe in it. More frequent use may increase provider's familiarity with the partograph and decrease the time needed to fill it out. Unless the partograph is seen as a crucial management tool AND medical record by all providers, especially the obstetricians and doctors, it will be difficult to implement universal usage.

Postpartum hemorrhage is one of the most frequent causes of maternal death. Providers report that the management of bleeding, both in pregnancy and postpartum, was another of the most useful topics covered in the training. Although providers were better able to manage atony after the training (percent mean score 74%), the reported levels of confidence and demonstrated ability to perform internal, bimanual compression were low (46% and 32% respectively). Internal, bimanual compression is an important life-saving skill that is not difficult to learn but frequently overlooked by trainers and providers.

No differences were detected in the knowledge test scores among the providers by training status. This may reflect the difficulty in devising a single knowledge test that can differentiate knowledge levels among different groups of providers (doctors, nurses, and auxiliaries). However, the high knowledge test scores (all over 70%) and the differences detected in confidence level and the ability to perform skills, when providers who had received training were compared to those who have not, highlight the deficiency in using knowledge tests to adequately assess quality of care.

The results of this evaluation should be useful to the JHPIEGO Maternal and Neonatal Health Program (MNH) as they plan for continuing activities in Sololá, Totonicapán, and San Marcos and for expanding activities into Quiché. The tools used in the evaluation are also suited for providing baseline data in Jutiapa, Jalapa, and Santa Rosa and if desired, can provide a specific assessment of the obstetrical skills of general physicians.

Introduction

Guatemala has consistently reported very high rates of both maternal and infant mortality. According to the Ministry of Health and Public Social Assistance (MSPAS) in 1989, the maternal mortality rate (MMR) was estimated to be 248/100,000 live births. The neonatal mortality rate (NMR) for 1992 was 16/1000 live births (personal communication with Dr. Baudilio Sajché in February 1995). In rural areas, especially those with indigenous populations, perinatal and maternal mortality is generally higher than in urban areas. The highest rates are in the more isolated areas, where medical attention is minimal. While the causes of maternal mortality in Guatemala are similar to other developing countries—hemorrhage (39%), complications due to abortions (24%), sepsis (18%), and pre-eclampsia (14%), (MSPAS, 1989)—the present information system does not monitor nor report these complications, which means their true incidence is actually unknown.

In 1992, the MSPAS reported that 77 percent of Guatemalan women gave birth outside hospital facilities. The majority of rural Guatemalan women gave birth in their homes with the assistance of a comadrona (Traditional Birth Attendant). In the High Plains region where MotherCare works, more than 90 percent of births occurred in the home with either a comadrona or a family member. Indigenous women in the High Plains region rarely seek medical care during pregnancy or delivery. Those who have complications frequently receive no prenatal care, are not diagnosed in time, receive no medical attention, or arrive at the hospital too late and die in labor or from hemorrhage. Additionally, hospital care for obstetrical emergencies is often inadequate.

For many women, access to services is a major problem. There are few hospitals, and the hospitals are far from the women's communities. Mountainous terrain creates physical barriers, and roads are poorly maintained. Some families do not have access to transportation, especially at night. The experience of MotherCare I in Quetzaltenango suggests that cultural barriers prevent some women from seeking health services when complications occur. Obstetric services in hospitals are not familiar to these women or their families, and institutional care is sometimes developed in a way that is culturally unacceptable to the indigenous population. Of those deliveries occurring in hospitals, the nurses or auxiliaries are frequently the only providers available to deal with both normal and complicated cases. Almost none of the nurses and auxiliary staff have received training in these areas. At this time, because the government is not in a position to expand hospital capabilities in order to attend to uncomplicated births, some interventions directed toward reducing maternal and infant mortality must necessarily involve the comadrona as a way of providing services to those women at risk for complications.

MSPAS, conscious of this situation, asked for support from USAID, other agencies, and donors to develop service delivery models to reduce the high rates of maternal and perinatal mortality and morbidity. The Maternal Neonatal Health Program of Quetzaltenango (1990-1993), directed by INCAP (Instituto de Nutrición de Centro América & Panamá) and funded by MotherCare I through USAID, developed a model that could be replicated in other areas. In 1994, the MSPAS requested assistance from MotherCare II and USAID to replicate this model in other areas of the country: San Marcos, Sololá, and Totonicapán. In early 1997, the MSPAS solicited support again from USAID and MotherCare to expand certain components of the MotherCare Project in two additional health sectors of Region VI: Suchitepéquez and Retalhuleu.

The MotherCare II Project focused on increasing access to reproductive health services. Interventions included training the comadronas, mobilizing the community through educational campaigns, and improving the quality of services in the health centers, health posts, and area hospitals through the introduction of protocols for managing obstetrical and neonatal emergencies. Because

many hospitals do not have specialists in gynecology or obstetrics, care is generally provided by general practitioners, professional nurses without specialization, or nurse auxiliaries. The MotherCare Project identified this lack of professional obstetrical experience and/or specialized training as one of the causes of poor medical care. To improve medical care, the MotherCare Project initiated an in-service education program for hospital personnel (doctors, professional nurses, and auxiliaries). The goal of this competency-based training was to increase the clinical capabilities and interpersonal communication skills necessary for the management of obstetrical and neonatal complications, according to the newly implemented hospital protocols.

The MotherCare training program had four major objectives:

- 1. To improve the care provided to mothers and newborns by health providers**
 - recognize what is happening (normal and abnormal)
 - know what needs to be done (management at this level or emergency care with referral)
 - have the confidence to provide care (at level of competency for level of provider)
- 2. To improve communication between women/families and providers**
- 3. To improve record keeping by the use of partographs by all providers**
- 4. To improve the functioning of the medical team within a facility**
 - understand each other's roles in order to work together better
 - work together to remove structural barriers to the utilization of services or to the provision of high quality of services
 - work together to remove client-perceived or cultural barriers to the utilization of services

The physician's medical training occurred in the Medical School at the Hospital of Quetzaltenango. Two doctors rotated every month, from May 1997 to May 1998, and studied with a tutorial specialist in gynecology and obstetrics. The response was good from the doctors at Sololá and Totonicapán, with the participation of nine of ten physicians at each of these hospitals. The response from doctors at San Marcos was less (only one of 15 doctors participated), and none of the doctors participated from Suchitepéquez or Retalhuleu.

Nurses and auxiliaries were trained in the hospitals where they worked. They rotated two or three every month and were trained by local physicians who served as tutors. Of the five trainers, three are obstetricians (San Marcos and Retalhuleu) and two are general practitioners with training in obstetrical complications (Sololá and Totonicapán). A curriculum developed by MotherCare was used in the training and included theory and clinical experience to reinforce skills. Of the 67 nurses and 96 nurse auxiliaries who were identified to receive training in the five MotherCare hospitals, 57 (85%) of the nurses and 83 (86%) of the nurse auxiliaries participated.

A preliminary evaluation of the training was conducted in August 1998, with the primary purpose of field testing the instruments in preparation for the final evaluation under MotherCare III (George Gilson and Susan Colgate Goldman, Trip Report, May 18-29, 1998).

Monthly follow-up visits began in February 1999, and have augmented the training. A medical OB/GYN hired by MotherCare has visited each of the hospitals on a monthly basis. These visits have allowed for the revision of themes and clinical cases, with emphasis on case management. One of the outcomes from these follow-up visits was the strengthening of providers working as a team.

Plans are underway to continue the activities initiated by MotherCare and to expand into four new districts (Jutiapa, Jalapa, Santa Rosa, and Quiche) to be implemented by JHPIEGO's Maternal and Neonatal Health Program.

Methods

Evaluation Tools (see Appendix A for copies)

The training evaluation was conducted in Guatemala in June 1999. Five tools were developed and used to assess the major objectives of the training program (see **Table 1**). Three of the evaluation tools (clinical skills assessment with case scenarios, complications audit, and level of satisfaction course review survey) were revised by the evaluation team from the tools used in the preliminary evaluation in 1998. Two new tools (the knowledge test and level of confidence skill checklist) were developed for this evaluation. The five evaluators (authors) worked as a team to both revise and translate the evaluation tools.

In addition, interviews were conducted with hospital and nursing directors to receive feedback on their general opinion of:

- the training,
- the use of the partographs within their facilities,
- their relationship with the comadronas (traditional birth attendants),
- staff coverage with rotation through the maternity,
- monthly follow-up visits by a MotherCare consultant, and
- strategies to promote sustainable continuing education in their institutions

	KT ¹	LOCSC ²	CSA/CS ³	CA ⁴	LOSCRS ⁵
Improve care provided to mothers and babies	X	X	X	X	X
- recognize what is happening	X		X	X	
- know what needs to be done			X	X	
- be able to do it competently		X	X	X	X
Improve communication with women and families	X		X	X	
Improve record keeping by implementing partographs		X	X	X	X
Improve functioning of the team				X	X
¹ KT	Knowledge test				
² LOCSC	Level of confidence skill checklist				
³ CSA/CS	Clinical skills assessment with case scenarios				
⁴ CA	Complication audit				
⁵ LOSCRS	Level of satisfaction course review survey				

Knowledge Test

This written test, intended to test the health provider's knowledge of maternal/newborn care, consisted of 21 multiple-choice questions. The test opened with a clinical stem (case vignette) and was constructed so that only one correct answer was possible. Aspects of care/complications included: prenatal care, labor, newborn evaluation, postpartum infections, and birth control. The test required 20 to 40 minutes to complete.

Level of Confidence Skill Checklist

This tool was designed to identify provider's self-reported confidence level in specific maternal/neonatal skills. Providers were asked to answer each question according to their comfort level with YES (two points), *A Little* (one point), or NO for no or no response (zero points). The categories and number of questions included prenatal care (16 questions), intrapartum care (16 questions), newborn care (four questions), and postpartum care (two questions). Completion of the checklist took ten to 15 minutes. The evaluators were available to assist the providers in understanding/answering the questions.

Clinical Skill Assessment with Case Scenarios

Four skills were included in the skill assessment: (1) use of the partograph, (2) emergency breech delivery, (3) newborn assessment and resuscitation, and (4) management of postpartum hemorrhage due to atony. Clinical and interpersonal skills were evaluated using case scenarios and skill checklists that were adapted from the training course. Skills were demonstrated on models for breech delivery, newborn resuscitation, and postpartum hemorrhage. Participants were also required to fill in a partograph. The administration of the skill assessment took approximately one hour per participant.

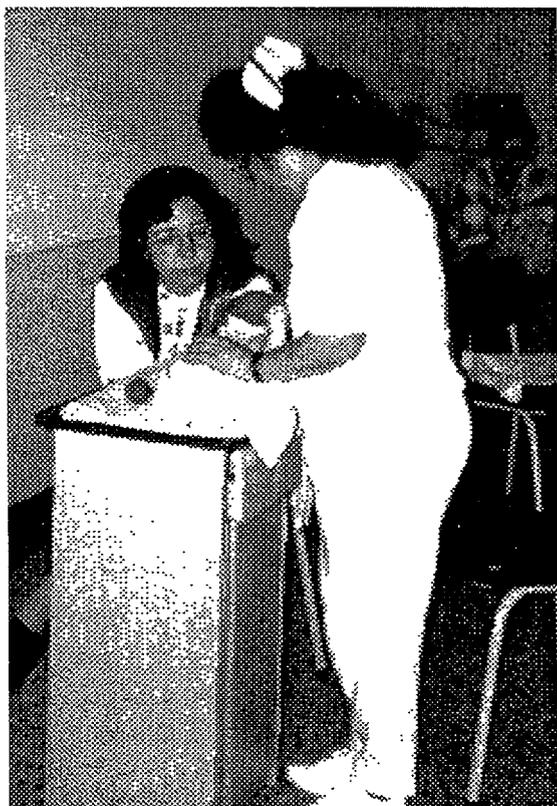
The skill checklists had a range of questions related to the provider's application and management interventions: partograph (48 questions), breech delivery (12 questions), newborn resuscitation (20 questions), and management of postpartum hemorrhage (14 questions). Interpersonal communication skills were included in the skill checklists. For all of the checklists except for the partograph, each question was worth a total of:

Two points if the skill or management was correctly applied

One point if the skill or management was partially-correct or prompted

Zero points for not applying or incorrectly applying the skill or management

Three questions were added to the original skill checklist of 17 questions for resuscitation of the newborn. This allowed for scoring when providers inappropriately did more than what was required in the case scenario (indicated that they would intubate, that they provided vigorous cardiac massage, or that they would insert an intravenous line before initially assessing and drying the baby).



Because the partograph checklists included items that were repetitive (plot 4 observations), this was taken into consideration when allocating points. Two points were given if the item was recorded correctly each time it was asked, one point if only some of the time, and zero points if never recorded correctly. This resulted in 25 items considered in the score instead of the original 48 questions.

Complication Audit

The complication audit was used to identify the types of complications that the trained providers have encountered and to define how the MotherCare training was applied in their decision-making and management of complications in a real-life situation. Providers from Quiche were asked to share a recent complicated case to see what types of complications they had experienced and their management. Completion of the audit in one-on-one interviews took five to ten minutes.

Level of Satisfaction Course Review Survey

The providers who received MotherCare training filled out a course review survey based on how “useful” and “not useful” they found their training. In addition, the evaluators asked if the training had improved the way the “medical team” was working together and if there was any feedback on the monthly follow-up visits. The survey took five to ten minutes to complete.

Sampling

A convenience sample of participants was selected from the providers who had received MotherCare training and who had not participated in the preliminary evaluation in August 1998. Participants from hospitals in Sololá, Totonicapán, and San Marcos were designated as TRAINED 1. Those from hospitals in Retalhleu and Suchitepéquez were designated as TRAINED 2. This group was differentiated as TRAINED 2 because only the nurses and nurse auxiliaries at these two hospitals had received training and because the training program began later than the programs in the other three hospitals. A third group, designated as BASELINE, was selected from the regional hospital in Quiche. Because the providers at these hospitals have not received training, the results serve as a baseline to represent the level of knowledge and skills prior to training. This is one of the districts into which the project will be expanded by the JHPIEGO Maternal and Neonatal Health Program.

The level of satisfaction course review survey was given to the TRAINED providers to elicit information about the three things that were most useful and least useful about the course, how the functioning of the “medical team” had or had not been impacted by the training, and the usefulness of the follow-up supervisory visits. All of the tools were applied in the TRAINED 1 group. The TRAINED 2 group received three tools (the knowledge test, level of confidence skill checklist, and the level of satisfaction course review survey). The BASELINE group received all but the level of satisfaction course review survey (see Table 2).

Implementation

The evaluation process took approximately two hours per person to complete, and it was conducted at each of the six hospitals. Participants completed the written knowledge test, level of confidence skill checklist, and the level of satisfaction course review survey before the skill assessment and complication audit. Four stations were set up for each of the four skills for the skill assessment. The same evaluator evaluated performance at each station in order to facilitate internal consistency. The complication audit was administered as an interview by one of the evaluators, following completion of the other four skills.

	KT ¹	LOCSC ²	CSA/CS ³	CA ⁴	LOSCRS ⁵
Sololá	X	X	X	X	X
Totonicapán	X	X	X	X	X
San Marcos	X	X	X	X	X
Retalhleu	X	X			X
Schitepéquez	X	X			X
Quiche	X	X	X	X	

¹ KT Knowledge test
² LOCSC Level of confidence skill checklist
³ CSA/CS Clinical skills assessment with case scenarios
⁴ CA Complication audit
⁵ LOSCRS Level of satisfaction course review survey

Analysis

Data were entered and analyzed in *EPI-INFO, Version 6*. Double entry was used to screen for data entry errors. The responses of the TRAINED 1 providers were compared to those of the BASELINE group and to those of TRAINED 2. During the evaluation, a few of the participants were called away before completion of the whole set of instruments. Those participants were excluded from the analysis, and this is noted when the pertinent results are presented in the RESULTS section.

Mean scores were calculated for the knowledge test (percent of questions answered correctly), for the level of confidence skill checklist (absolute and percentage), and for the clinical skill assessment (absolute and percentage). Overall score for the level of confidence skills checklist was obtained by adding the points for each skill included in the list. Overall score for the clinical skill assessment was obtained by averaging the percent mean score for each of the four skills, hence giving each skill equal weight in the overall score. The allocation of points for the partograph skill assessment is described in the description of the tools. Because the mean scores were not necessarily normally distributed, non-parametric statistics (Kruskal-Wallis test) were used to determine P values. Frequency distributions were used to compare response for individual skills with the response dichotomized into YES (demonstrated skill or felt confident) or NO (any other response). Chi-square or Fisher exact was used to determine P values. Statistical significance was set at $P < 0.05$.

We recognize that the small number of participants included in the evaluation limited the ability to determine statistically significant differences among individual provider types (physicians, nurses, and auxiliaries) or among hospitals.

Results

Description of Participants

Seventy-two providers were included in the in-service training evaluation. The distribution among type of provider and facility is shown in **Table 3**. To determine the providers' relative obstetrical activity, they were asked to estimate the number of deliveries they had attended or had provided care for in the past two months. At the time of the skill assessment for breech delivery, those who participated (TRAINED 1 and BASELINE)

were asked if they had ever assisted a women with a breech delivery. The results are shown in **Table 4**. Eleven providers did not provide information on the number of deliveries in the past two months. Of the 61 providers who responded, only six (10%) reported no deliveries, and more than half (52%) reported more than ten deliveries in the last two months. The providers at Quiche appeared to be less active than those at the other hospitals. Of the 48 providers who were asked, most (69%) reported that they had been responsible for assisting a woman with a breech delivery.

Designation	Facility	Physicians	Professional Nurses	Auxiliary Nurses	TOTAL
TRAINED 1	Sololá	2	1	6	9
	Totonicapán	2	1	5	8
	San Marcos	0	2	4	6
TRAINED 2	Retalhuleu	0	3	5	8
	Suchitepéquez	0	8	8	16
BASELINE	Quiche	4	11	10	25
TOTAL		8	26	38	72

Instrument Results - Evaluation of the Knowledge Test

The percent mean scores for the knowledge test (74.6, 75.0, and 70.6) did not differ significantly among the three groups (TRAINED 1, TRAINED 2, and BASELINE respectively, $P=0.42$). Also, There were no differences detected when TRAINED 1 was compared to BASELINE, TRAINED 1 to TRAINED 2, or among facilities (see **Table 5**).

Facility	Number of providers	Number of Births in the last 2 months					Number of providers reporting having done a breech delivery
		0	1-5	6-10	>10	?	
Sololá	9	0	3	1	5	0	8 (89%)
Totonicapán	8	1	2	1	4	0	5 (63%)
San Marcos	6	0	1	0	5	0	3 (50%)
Retalhuleu	8	0	0	0	3	5	NA
Suchitepéquez	16	0	2	4	8	2	NA
Quiche	25	5	4	5	7	4	17 (68%)
TOTAL	72	6	12	11	32	11	33 (69%)*

* of 48, excluding Retalhuleu and Suchitepéquez

Comparison		P value
TRAINED 1 (74.6) compared to BASELINE (70.6)		0.27
TRAINED 1 (74.6) compared to TRAINED 2 (75.0)		0.86
Among Facility		0.13
Sololá	80.4	
Totonocapán	66.1	
San Marcos	77.0	
Retalhuleu	69.6	
Suchitepequez	77.6	
Quiche	70.6	

When individual questions were compared, significant differences were detected in five questions (see Table 6). However, the direction of the difference was not always consistent. Most of the providers who received MotherCare training incorrectly recognized that a vaginal exam is contraindicated in a woman with third trimester vaginal bleeding (question 3) but were able to report the correct management for eclampsia (question 12) and for prolonged labor (question 19). Trained providers were less likely to recognize the need for partographs for all women (question 5). Also, there was no universal recognition that breastfeeding is the optimal feeding for healthy, low birth weight babies (question 16). Differences in the ability of the trained providers to be able to better define the management for shock due to postpartum hemorrhage due to retained placenta (question 15) approached statistical significance (P=0.09). These discrepancies may reflect either confusion in the interpretation of the question or in variations with the training programs.

Overall, the knowledge test revealed apparently good recognition of septic abortion (question 1), breech presentation (question 9), and postpartum endometritis (question 11), as well as a good understanding of the management of severe pre-eclampsia (question 8) and lacerations (question 18) by all providers. However, the calculation of the APGAR score (question 6), identification of lacerations as a cause of postpartum bleeding (question 10), management of premature rupture of the membranes regardless of gestational age (questions 13 & 14), and thermal control for healthy, low birth weight newborns (question 17) remain weak even after training.

Instrument Results – Skill Level Confidence

Two providers from the TRAINED 2 group did not complete the skill level confidence tool. Providers who received MotherCare training report more confidence in performing select skills needed in providing care during labor and delivery, caring for the newborn, and recognizing complications in postpartum woman (see Table 7). No differences were detected when the two TRAINED groups were compared; the differences were primarily due to lower levels of confidence reported among the BASELINE providers (see Table 8). Mean scores by facility are reported in Appendix B, Table B-1.

Skill Category	Total Possible Points	TRAINED 1 N=23	TRAINED 2 N=22	BASELINE N=25	P Value
Prenatal Care	32	25.0 (78%)	25.3 (79%)	20.7 (65%)	0.25
Care During Labor	32	26.5 (83%)	26.1 (82%)	20.9 (65%)	0.02
Newborn Care	8	7.1 (89%)	6.8 (85%)	5.5 (69%)	0.007
Postpartum Care	4	3.3 (83%)	3.8 (94%)	2.8 (70%)	0.02
TOTAL SCORE	76	61.9 (81%)	62.0 (82%)	49.8 (66%)	0.03

Table 6
Frequency Distribution Of Correct Answers In Knowledge Test

Question		TRAINED 1 N=24	BASELINE N=25	TRAINED 2 N=23	P Value
1	Septic abortion	96%	88%	96%	0.42
2	Identify probable placenta previa	65%	46%	64%	0.31
3	Intervention in diagnosis for #2 (no vaginal exam)	96%	71%	60%	0.01
4	Management of initial labor	74%	67%	68%	0.85
5	Who needs a partograph	39%	67%	80%	0.01
6	APGAR calculation	35%	38%	36%	0.98
7	Management of placental birth	65%	63%	64%	0.98
8	Severe pre-eclampsia in labor	100%	100%	100%	1.00
9	Identification of breech	91%	88%	88%	0.90
10	Identification of tears for postpartum hemorrhage	57%	67%	44%	0.28
11	Identification of woman with postpartum sepsis	100%	100%	100%	1.00
12	Management of eclampsia	70%	88%	52%	0.03
13	Management of PROM at term	44%	42%	32%	0.68
14	Management of PROM pre-term	61%	63%	52%	0.72
15	Management of shock due to PPH and placental retention	91%	96%	76%	0.09
16	Breastfeeding for low weight normal newborn	87%	100%	100%	0.04
17	Maintain body temperature of the low weight normal newborn	65%	75%	64%	0.67
18	Management of tears	87%	91%	92%	0.81
19	Management of prolonged labor	83%	63%	48%	0.04
20	Actions for helping the woman	96%	96%	96%	1.00
21	Interpersonal communication actions	65%	71%	72%	0.86

Table 8
Absolute (Percent) Mean Scores for Level of Confidence in Performing Selected Skills by Training Status

Skill Category	Total Possible Points	TRAINED 1 vs. BASELINE			TRAINED 1 vs. TRAINED 2		
		TRAINED 1 N=23	BASELINE N=25	P Value	TRAINED 1 N=23	TRAINED 2 N=24	P Value
Prenatal Care	32	25.0 (78%)	20.7 (65%)	0.17	25.0 (78%)	25.2 (79%)	1
Care During Labor	32	26.5 (83%)	20.9 (65%)	0.008	26.5 (83%)	26.1 (82%)	0.47
Newborn Care	8	7.1 (89%)	5.5 (69%)	0.003	7.1 (89%)	6.8 (85%)	0.62
Postpartum Care	4	3.3 (83%)	2.8 (70%)	0.13	3.3 (83%)	3.8 (94%)	0.26
TOTAL SCORE	76	61.9 (81%)	49.8 (66%)	0.02	61.9 (81%)	62.0 (82%)	0.78

To better understand these differences, the reported confidence in using a particular skill in the case scenario was compared between TRAINED 1 and BASELINE providers. Table 9 includes those skills for which differences were detected as significant ($P < 0.05$) and approaching statistical significance ($P < 0.10$) levels. Full details are reported in Appendix B, Table B-2.

TRAINED 1 and 2 providers reported feeling more confident than BASELINE providers in obtaining history, identifying a woman with severe pre-eclampsia, identifying a woman with abnormal labor, and identifying a newborn with sepsis. Also, they were more confident in knowing how to manage a woman with severe pre-eclampsia or eclampsia and in knowing how to manage a woman with premature rupture of the membranes after 12 hours. Reported higher confidence approached statistical significance among TRAINED 1 and 2 providers in monitoring a woman in labor, delivering care in the third stage of labor, identifying lacerations, estimating blood loss, and identifying a woman with mastitis. Differences in reported confidence in calculating estimated date of delivery and gestational age, identifying a woman with hyper-reflexia, identifying a woman with clinical signs of anemia, performing internal, bimanual compression for uterine atony, and caring for low birth weight newborns showed inconsistent variations among the groups

Skill Assessment

One provider from each group did not complete the skill assessments. An additional provider from TRAINED 1 did not complete the assessment for resuscitation of the newborn. This provider is also excluded from the analysis for the overall score.

The providers who received MotherCare

Table 10
Absolute (Percent) Mean Scores in Application of Skills by Training Status

Skill Category	Total Possible Points	TRAINED 1 N=22	BASELINE N=24	P Value
Partograph	50	40.9 (82%)	12.3 (25%)	<0.001
Breech Delivery	24	11.0 (46%)	7.5 (31%)	0.01
Newborn Resuscitation	40	22.8 (57%)*	20.3 (51%)	0.05
Postpartum Hemorrhage	28	20.6 (74%)	16.2 (58%)	0.005
OVERALL SCORE		64%*	41%	<0.001

* N=21 for TRAINED 1 group

Instrument Results –

Table 9					
Frequency Distribution Of Skills With Differences¹ Among Respondents Who Felt Confident ² In Performing Selected Skill					
		TRAINED 1 N=23	TRAINED 2 N=24	BASELINE N=25	P Value
PRENATAL CARE					
1	<i>Obtain a current medical, social and obstetrical history of this pregnancy</i>	65%	73%	36%	0.03
2	<i>Calculate gestational age and probable delivery date from the LMP</i>	74%	96%	72%	0.09
9	<i>Identify a woman with sever pre-eclampsia</i>	96%	82%	56%	0.004
10	<i>Identify a woman with hyper-reflexia</i>	44%	14%	32%	0.09
11	<i>Know what to do for a woman with severe pre-eclampsia or eclampsia</i>	83%	77%	44%	0.008
12	<i>Know how to identify a woman with anemia by clinical signs and symptoms</i>	100%	82%	80%	0.08
16	<i>Manage premature rupture of membranes after 12 hours</i>	74%	77%	44%	0.03
CARE DURING LABOR					
1	<i>Perform monitoring and follow-up of a laboring woman</i>	91%	91%	68%	0.05
4	<i>Identify a woman in abnormal labor</i>	96%	96%	60%	<0.001
9	<i>Assist during delivery of the placenta</i>	91%	100%	80%	0.07
10	<i>Identify tears after delivery</i>	83%	91%	64%	0.07
12	<i>Estimate the amount of blood loss</i>	87%	86%	64%	0.09
14	<i>Perform an internal bimanual compression during uterine atony</i>	48%	18%	8%	0.004
NEWBORN CARE					
3	<i>Care of the low birth weight newborn</i>	91%	73%	64%	0.08
4	<i>Identify the newborn with sepsis</i>	78%	73%	28%	0.001
POSTPARTUM CARE					
2	<i>Identify a woman with breast infection</i>	70%	82%	48%	0.05
¹ Differences at P values < 0.05(bold) and at 0.05<P<0.10 (<i>italics</i>) ² Confident defined as reported as "Yes" on questionnaire					

training (TRAINED 1) were more able to perform three of the four skills (partograph, breech delivery, and postpartum hemorrhage) (mean percent scores 82%, 46%, and 74% respectively) than the providers from the BASELINE group (25%, 31%, and 58% respectively, P values all <0.01). The TRAINED providers were borderline significantly better able to perform resuscitation than the BASELINE providers (mean percent scores of 57% and 51%, P=0.05) (see Table 10). Mean scores by facility are reported in Appendix B, Table B-3.

To better understand these differences, the ability to correctly apply a particular skill in the case scenario was compared between

TRAINED 1 and BASELINE providers. Differences in skills identified as statistically significant (P<0.05) and those approaching statistical significance (0.05>P<0.1) are included in Tables 11 to 14. Frequency distribution for the ability to correctly perform all individual skills by training status is found in Appendix B, Tables B-4 to B-7.

In general, the partograph was better used by TRAINED 1 providers (see Table 11). This finding was not unexpected. Although use of the partograph is a country policy, this policy is fairly recent and as a result, not yet well-implemented. Use of the partograph was included and emphasized in the training. However, it is not universally used even in the hospitals where training was conducted.

		TRAINED N=23	BASELINE N=25	P Value
2	<i>Calm the woman & explain what you are going to do</i>	55%	25%	0.08
4	Perform a vaginal exam to verify complete dilatation and absence of a prolapsed cord	64%	25%	0.02
5	<i>Cover the exposed fetal parts with a towel or wrap to protect the fetus from becoming cold</i>	46%	17%	0.07
11	If the head does not come out, introduce fingers into the vagina to flex the baby's head	77%	38%	0.02
12	Be prepared to resuscitate the newborn	73%	38%	0.04

¹Differences at P<0.05 (**bold**), at 0.05<P<0.01 (*italics*)

		TRAINED N=21	BASELINE N=24	P Value
1	Clear the airway position and aspiration	95%	71%	0.05
2	Dry and wrap newborn (or put beneath heat source), stimulate	48%	8%	0.008
5	Evaluate the APGAR (APGAR 3)	67%	8%	<0.001
7	Resuscitate: mouth to mouth or ambu with oxygen @10 L/min	71%	29%	0.01
9	<i>Keep warm or beneath a heat source</i>	71%	42%	0.09
12	Maintain cardio-respiratory resuscitation efforts until the heart rate is 80/min or spontaneous respiration begin	67%	17%	0.002
13	Maintain heat, oxygen, and stimulation until newborn is pink	91%	21%	<0.001
15	Explain what you are doing	62%	100%	0.004
16	Do not initiate the resuscitation with intubation	81%	100%	0.04

¹Differences at P<0.05 (**bold**) at 0.05<P<0.01 (*italics*)

Skill level among TRAINED 1 providers to provide care for an emergency breech delivery was higher than among the BASELINE providers, although still at a lower than desirable level (see Table 12). TRAINED providers were more likely to perform some key skills in assisting at a breech delivery: confirm full cervical dilatation, maintain flexion of the head, and prepare for resuscitation of the newborn.

Resuscitation of the newborn was not done well by either group, although the TRAINED 1 providers were better able to dry and stimulate the

Table 11
Differences¹ in Frequency Distribution of Correct Application of the Partograph
Identified in Skill Assessment

Item on skill checklist		TRAINED 1 N=22	BASELINE N=24	P VALUE
Initial filling out the partograph:				
	1) name and obstetrical history	86%	21%	<0.001
	2) date and time of admission	82%	29%	0.001
	3) state of the membranes	73%	4%	<0.001
	4) determine if pre-term or term	36%	0%	0.001
Note observations on the partograph:				
	5) in the correct place	59%	4%	<0.001
	6) blood pressure	82%	13%	<0.001
	7) pulse	77%	13%	<0.001
	8) temperature	82%	17%	<0.001
	9) FHR (fetal heart rate)	77%	4%	<0.001
	10) frequency of contractions	50%	4%	0.002
	11) duration of contractions	46%	4%	0.004
	12) fetal position	64%	4%	<0.001
	13) head descent	36%	4%	0.009
	14) cervical dilatation	73%	4%	<0.001
	15) state of the membranes	59%	4%	<0.001
Determine a plan of action for admission				
	17) <i>rest or walk around if she desires</i>	77%	46%	0.06
	19) monitor labor	86%	50%	0.03
Determine a plan of action 4 hours after admission				
	20) ambulation	86%	42%	0.005
	21) continue to take liquids	77%	25%	<0.001
Determine a plan of action 8 hours after admission				
	22) <i>keep her on left side at rest</i>	82%	50%	0.05
	23) monitor the FHR	96%	29%	<0.001
	24) monitor the dynamics	86%	29%	<0.001
	25) interpret the curve forming on the partograph	100%	16%	<0.001

¹Differences at P < 0.05 (**bold**), at 0.05 < P < 0.01 (*italics*)

newborn, correctly calculate the APGAR score, ventilate the newborn with mouth to mouth or ambu, appropriately perform cardiac massage, and maintain resuscitation efforts (see **Table 13**). It was distressing to note that the TRAINED providers were more likely to indicate the use of more extreme measures for resuscitation before initial assessment and stimulation of the newborn. However, this may only reflect their desire to demonstrate their newly learned skills.



Providers from TRAINED 1 were better able to manage postpartum hemorrhage due to uterine atony than BASELINE providers. The TRAINED providers were more likely to initially massage the uterus and expel clots, perform external, bimanual compression when indicated, indicate that they would monitor the woman for at least 30 minutes after stabilization, and communicate with the patient and the family (see **Table 14**).

Instrument Results – Complicated Case Review

Almost all the providers were able to describe a complication they had recently treated. The complications discussed by the trained providers included: postpartum hemorrhage (5), breech delivery (4), severe pre-eclampsia (4), cephalopelvic disproportion (3), fetal distress (2), uterine inversion with shock (1), VBAC (1), pre-term labor with PROM (1), and shoulder dystocia (1). The TRAINED 1 providers reported no maternal deaths but did include three neonatal deaths. In general, the TRAINED 1 providers indicated that they were able to treat these severe complications with more confidence. They felt this was a result of a better base of knowledge and clinical skills that they had acquired during the training. In particular, the three cases of cephalopelvic disproportion were recognized and reported to the physician by nurse auxiliaries as a result of their using the partograph for the management of the progress of labor. Nurses and auxiliaries also noted enhanced confidence in approaching physicians as a result of the team concept fostered during the training.

		TRAINED 1 N=22	BASELINE N=24	P Value
2	<i>Do uterine massage and evacuation of clots</i>	82%	50%	0.05
10	Do external, bimanual compression if atony or hemorrhage continues	86%	46%	0.01
12	Monitor pulse, blood pressure, and safety measures every thirty minutes until she stabilizes and the uterus remains contracted	77%	38%	0.02
13	Calm the patient and her family members	86%	38%	0.002

¹ Differences at P < 0.05 (bold), at 0.05 < P < 0.01 (*italics*)

The complications mentioned by the BASELINE providers included: neonatal sepsis and asphyxia (7), breech (4), malpresentation (3), severe pre-eclampsia/eclampsia (2), postpartum hemorrhage (2), shoulder dystocia (2), ruptured uterus (1), postpartum hemorrhage (1), and hyperstimulation following oxytocin augmentation (1). Two maternal deaths and seven neonatal deaths were reviewed in this group. In general, the BASELINE providers, especially the non-physicians, seemed to have been more passive observers of these complications and voiced a lack of confidence about their management skills, especially their ability to manage the depressed newborn. **Appendix C** contains the details of the cases noted in the review of complicated cases.

Topic	Number of respondents
Management of bleeding in pregnancy or postpartum	23
Use of the partograph and care in labor	21
Delivery care, including delivery of the placenta and postpartum care	13
Management of eclampsia/pre-eclampsia	12
Newborn care and resuscitation	9
Breech delivery	7
Management of women with complications	7
Use of oxytocin for induction and augmentation	6
Physical exam, such as Leopold's vaginal exam	6
Episiotomy	5

***Instrument Results –
Level of Satisfaction of Trained Providers***

Each provider who participated in the MotherCare Training (TRAINED 1 & 2) was requested to identify the three most useful and the three least useful things included in the training. Three providers did not complete the survey. Thirty-seven (84%) of the respondents included at least one clinical topic (see **Table 15**). Management of hemorrhage during pregnancy or postpartum and the use of the partograph and labor care were reported by more than half of the respondents.

All of the respondents felt that the training had improved teamwork. They felt that they had better working relationships with each other, especially among the doctors and the nursing staff. They felt that they worked better together to provide better care and now spoke a more common language. Some of the nursing staff explicitly stated that they felt the doctors now had more confidence in them. The respondents appreciated the monthly follow-up visits. They valued the opportunity to receive feedback on the care they provided, to reinforce knowledge and skills included in the training, and to learn new things. Some stated that the monthly follow-up visits stimulated them to read and study more. Almost all of the respondents felt that all of the information was useful when asked to identify the three topics they found less useful.

Interviews with the Hospital and Nursing Directors

General Opinion of the Training

The nursing and hospital directors interviewed in the five visited hospitals agreed with the training achievements made with the support of MotherCare. Among these achievements the most frequently mentioned were:

- changes in the attitude of the professionals to improve the quality of care,
- improvement in the prompt identification and appropriate management of complications,
- teamwork and awareness of the deficiencies in care, and
- recognition of the need to make necessary changes.

To a lesser degree, improvement in patient treatment was also mentioned. The interviewees also emphasized that the personnel were very satisfied with the methodology used (tutorship and competency-based training).

The most frequently mentioned difficulty in all the hospitals was the lack of participation of the doctors in the medical training: no participation from Suchitepéquez and Retalhuleu, only one from San Marcos, and nine in Sololá and Totonicapán. The reasons given by the doctors were: little interest in the in-service training, no need for the training, contents too basic and already known to them, lack of time to leave their private practice obligations, lack of incentive for on-going education, and disagreement with some protocols (the reference document for the training). The doctors were trained via a tutorial internship in the Hospital of Quetzaltenango for 20 days (20 theoretical hours and 176 practical hours). The training option was offered to all doctors who work in hospitals within the MotherCare project areas.

In spite of the above-mentioned reasons for low participation by doctors, the hospital directors do recognize deficiencies in the care provided by physicians due to different management styles, the place and individual pre-service training their personnel received, as well as difficulties in revising and analyzing complicated cases. They also recognize the usefulness of the protocols to unify clinical management and to serve as a guide, especially for the case reviews. This is very important if one considers the fact that most of the doctors are general practitioners who rotate among the different services of the hospital. Also, in some hospitals, a separate group of doctors covers the night shift. This severely limits their contact with the other doctors for possible revision of clinical management and exchange of experiences.

In general, the directors are not clear as to how to achieve a greater commitment from the doctors in the use of the protocols. Two strategies mentioned were:

- 1) stressing the legal threats to professional in those complicated cases where management was not according to the established protocols
- 2) developing a review program for bringing the doctors up-to-date on obstetrical topics—this is an area that needs to be further explored

Responses from the nurses and nurse auxiliaries were very positive in terms of participation in the training and in their ability to apply their new skills and knowledge. This is especially clear in the hospitals where doctors participated in the training. In the hospitals where there has been less participation by the doctors, the nurses and auxiliaries complained that this has affected their ability to apply their new skills.

All the interviewees were very emphatic in highlighting the personal virtues of the tutor responsible for the training, as well as their commitment and the dedication associated with the obtained achievements. They also emphasized the necessity of finding appropriate strategies in order to involve other doctors in the in-service training.

Use of the Partograph

From the beginning of training, the use of the partograph was emphasized but not yet universally accepted. The hospital and nursing directors recognize that its implementation is still in progress. One director said that they used the partograph for all women in labor (San Marcos). Others admitted to using it "most of the time," when they had enough time to use it. The reason given by the directors is that it takes a lot of time to fill out and thus cannot always be used due to the lack of personnel, especially in the afternoons and nights. Nevertheless, all the directors recognize the utility of using the partograph for the identification of problems during labor and for decision-making. Also, they recognize the necessity of case revisions, in terms of improving clinical management, and searching for strategies to assure the partograph's use by doctors.

The graduate nurses who received training in the use of the partograph are using it. However, in the hospitals where there are no trained doctors, the nurses cannot make the decision as to whether or not they should use the partograph, which they see as affecting their performance. They also complained that the doctors have different individual ways of filling out the partograph.

Situation with the Comadronas (Traditional Birth Attendants)

Changes of attitude have taken place after the training in terms of a greater acceptance toward the comadronas when bringing women into the hospital. In some hospitals, they have been authorized to enter with the woman and to remain with her until the resolution of childbirth (Sololá and San Marcos); in others, they allow the comadrona to enter, so she will know the hospital and be able to observe. In still others, they do not allow them to enter at all, arguing that there is reduced space or lack of sterility. It is also mentioned that some doctors do not like to be observed by the comadrona. Some hospitals are collaborating with the Regional Area of Health (within the Ministry of Health) in the training of comadronas. The hospital directors recognize that the participation and trust of comadronas in the system are processes that should be encouraged. In one hospital it was mentioned that this change toward the comadrona has increased the demand for services and that they bring women with complications to the hospital in a more opportune manner.

Personnel Rotation

It has been difficult to retain trained personnel in obstetrical service areas without rotating them out. The reasons given are shortages of personnel, especially at night, the need to make changes for vacations, and retirement. Also, the provider's request changes every so often. Although some hospitals have experimented with establishing a core maternity staff, at the present time in all the hospitals visited, the personnel rotate through maternity.

Follow-up Visits Made by MotherCare

A medical OB/GYN hired by MotherCare has followed-up training by means of monthly visits programmed at each one of the hospitals between February and July of 1999. This activity has allowed for the revision of themes and clinical cases, with emphasis on case management. It has also allowed for the identification of deficiencies in clinical management, especially of doctors. The participation of the doctors is minimal, arguing lack of time, especially by those that work only at night.

Some of the directors think that follow-up is a good way for beginning to unify criteria for clinical management (use of protocols). It has been beneficial when the doctor is an external specialist to the hospital, as the acceptance is better.



Continuity and Sustainability of the Training

Given the observed achievements of this training, the opinion of the directors is that the training should continue for all hospital personnel and new professionals who enter the service. All agree on incorporating this training as a program of continuous education in the hospital, using the methodology of tutorship (personalized and competency-based) along with follow-up of the training. The hospital directors consider the following decision-making capabilities by the Ministry of Health as a necessary condition in order to continue the training process in a continuing manner:

- finance the tutor responsible for the training
- determine the use of having a training program for all personnel
- ensure the use of the protocols (to know them and to have enough available)
- define a day each month for the systematic revision of complicated cases with all personnel
- realize this training during working hours
- ensure enough provision of inputs and equipment, as defined in the protocols of clinical management

Some directors have coordinated with the Regional Area of Health and have received support to finance the tutor. In Suchitepéquez tutors are continuing voluntarily.

Conclusions

This evaluation shows that MotherCare training increased the confidence and ability of providers to perform crucial skills in order to provide high quality maternal and newborn care. The effect of the in-service training continues even more than two years after the completion of the training course. Trained providers are significantly better than those who have not received the training in using the partograph, performing a breech delivery, and managing postpartum hemorrhage due to atony. In addition, following the training, providers seem to be able to apply their knowledge of management of complications. Providers who have received training and the directors in their facilities (Hospital and Nursing Directors) report that the training has improved the attitude of the providers toward providing care, the ability of the providers to recognize problems early and intervene, and the relationship among medical team members.

Statistically significant levels of confidence in performing skills related to care in labor and delivery, care of the newborn, and postpartum care are reported higher among the providers from the five district hospitals in Health Region VI, where MotherCare worked, when compared to the providers from a district where activities are in the process of being expanded. Confidence in performing skills related to prenatal care is slightly higher but not statistically significant among the trained providers.



Although scores are higher in the skill performance among the providers who received training, their ability to adequately manage a breech delivery and to resuscitate a newborn continues to be less than desirable (percent mean scores were 46% and 57% respectively). These two skills are not frequently used, but life-saving when needed. The situations in which these skills are needed are frequently unpredictable, so all providers who cover the maternity need them. Frequently, immediate newborn care seems to fall outside the realm of obstetrics in some facilities, and as a result, does not get well-addressed in training by obstetricians. Strategies to address this deficit need to be developed jointly between the obstetric and pediatric departments in the hospitals.

The providers who received training in the use of the partograph reported this as one of the most useful topics in the training. While the use of the partograph is a national policy, it was not used in the hospitals in the MotherCare districts before the training and is not used in the Quiche hospital. Even within the MotherCare hospitals, the use of the partograph is not universal. The most frequent reasons given for non-use by providers were: they were too busy and completion of partograph took too much time and the doctors did not believe in it. More frequent use may increase providers' familiarity with the partograph and decrease time needed to fill it out. Unless

the partograph is seen as a crucial management tool AND medical record by all providers, especially the obstetricians and doctors, it will be difficult to implement universal use.

Postpartum hemorrhage is one of the most frequent causes of maternal death. The providers reported that the management of bleeding, both in pregnancy and postpartum, was another of the most useful topics covered in the training. Although providers were better able to manage atony, the reported levels of confidence and demonstrated ability to perform internal, bimanual compression were low (46% and 32% respectively, see **Appendix B**). This is an important life-saving skill that is not difficult to learn but frequently overlooked by trainers and providers.

No differences were detected in the knowledge test scores among the providers by training status. This may reflect the difficulty in devising a single knowledge test that can differentiate knowledge levels among different groups of providers (doctors, nurses, and auxiliaries). However, the high knowledge test scores (all over 70%) and the differences detected in the level of confidence and the ability to perform skills highlight the deficiency in using knowledge tests to adequately assess quality of care when providers who had received training were compared to those who had not.

Recommendations

The results of this evaluation should be useful to the JHPIEGO Maternal and Neonatal Health Program as they plan for continuing activities in Sololá, Totonicapán, and San Marcos and for expanding activities into Quiché. The tools used in the evaluation are also suited for providing baseline data in Jutiapa, Jalapa, and Santa Rosa and if desired, a specific assessment of the obstetrical skills of general physicians.

Specific recommendations include the following:

- In-service training for maternal and newborn care is needed by most general physicians, nurses, and nurse auxiliaries in Guatemala. This training needs to be institutionalized on a permanent basis. Due to frequent personnel rotation, there are always new people to be trained. Continuing education could also help integrate the new personnel into the team.
- Future training programs should be planned in such a way as to give trainees more supervised clinical hours for practical experience. Competency in skills require someone to correctly teach and supervise the trainee's practice to learn the new skill correctly. This may require a mechanism to pay tutors for the hours in which they perform direct supervision/instruction in clinical areas for trainees.
- The model used to provide training for nurses and nurse auxiliaries within the facilities where they worked was received well and fostered teamwork among the providers. This model, as an alternative to more centralized training centers, should be considered in sites where teamwork is a problem.
- Based on the evaluation results, several suggestions to improve the teaching of the four skills included in the evaluation can be made:

Partograph

It is important to reinforce the use of the partograph by both doctors and nurses, and its use in hospitals should be encouraged. The majority of trained personnel need more instruction about:

- how to use basic graphic strategies
- how to graph and distinguish between latent and active phases of labor
- how to identify and graph the descending presenting part
- how to record labor contractions on the partograph
- how to identify and respond to variations from normal (the Alert Line and the Action Line)

One suggestion is to routinely place a partograph at the end of each patient's bed and request tutors to help train people in recording it with immediate interpretation after each vaginal exam. Unless the partograph is universally used within a facility, the impact of the training will not be maximized.

Emergency breech delivery

The skills to manage this complication need to be included in the training for all providers as the need to use this skill is universal and unpredictable.

Neonatal resuscitation

It is necessary to reinforce the immediate evaluation of the newborn (APGAR score) and appropriate resuscitation for both physicians and nursing staff. Different levels of capabilities may be appropriate for different levels of providers.

- For doctors, greater collaboration and good will are needed on the part of the Pediatric Department of the Regional Hospital in Quetzaltenango in order to integrate those trained physicians into an in-service education program that includes pediatric residents.
- It is not necessary to teach nurses or auxiliaries intubation skills for resuscitation of the newborn. However, they do need to learn to identify a depressed infant, clear the airway, maintain adequate core body temperature, administer adequate tactile stimulation, oxygen, and artificial respiration, and perform cardiac massage when indicated.

Bimanual compression for uterine atony

This is a simple life-saving skill that is ignored by many providers. This should be the intervention of first resort when faced with any excessive bleeding or boggy uterus.

- A specific strategy needs to be developed to motivate the doctors, from the general physicians to obstetricians, to update their skills and to support the efforts to upgrade the skills of the nurses and auxiliaries. The use of new skills is much easier in an environment in which the new skills are accepted as the standard of care.
- The Ministry of Health and Social Public Assistance must work toward expanding the obstetrical role of professional nurses and nurse auxiliaries, including officially authorized definitions of practices.
- The Ministry of Health and Social Public Assistance should begin to work with medical and nursing schools and their relevant authorities to incorporate an obstetrical and neonatal care curriculum into pre-service training programs for physicians, nurses, and auxiliaries. The required skills need to be seen as basic to the medical and nursing practice for all providers, especially with the current rotation of staff among the various services within facilities.
- Providers who lack the necessary obstetrical skills should undergo in-service training before they are rotated through the maternity.
- A trained nursing educator should serve as a tutor with the medical tutor. They could work together as role models to continue to encourage the concept of teamwork within hospital obstetrical services.
- Training follow-up must be done on a regular basis. Monthly visits by the tutor from Quetzaltenango is an excellent idea that should be continued. It is suggested that continuing education that is appropriate for all providers be conducted once a month. An appropriate place for these meetings could be the hospital of Quetzaltenango. A possible format could include. 1) morning didactics and rounds in the hospital, 2) ambulatory patient care, possibly one-on-one in the private clinic of the tutor, and 3) a night, on-call physician for labor and delivery with an obstetric and/or pediatric resident in charge. This would provide an excellent way to support the alternative in-facility training model used for nurses and auxiliaries.

- A system of continuing medical education credits may help to give an incentive for the activities mentioned above. MSPAS should consider institutional requirements for regular, professional, and continuing education programs, for both doctors and nursing personnel. Obligatory continuing educational credits could be given to those who acquire skills so that they are encouraged to continue a life-long learning pattern.
- Each hospital should be encouraged to have monthly team meetings on maternal and neonatal health in order to promote teamwork and problem solving, by way of group discussions on maternal statistics and complicated case management. These meetings should focus on positive changes and avoid searching for blame.
- Strategies for hospital supervision that may stimulate physician participation should be found.
- Teamwork and group participation among doctors and nurses should be encouraged in maternal case reviews in a systematic way, with education as its goal.
- Subsequent evaluations of the training of physicians and nurses should incorporate competency in skills by using hands-on testing, not just written knowledge tests.
- Improved care should be supported by guaranteeing the necessary supplies so that the different tasks can be performed with quality.

Appendix A
Instruments

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Instrument - Knowledge Test

Identifying Number: _____

Instructions: Carefully read each question and circle the correct answer. All of the questions have only one correct answer.

Elena presents at the hospital with a fever, pale and with a bloody purulent discharge. She has had amenorrhea for 11 weeks.

1. What problem do you suspect Elena has?
 - a) urinary tract infection
 - b) threatened abortion
 - c) septic abortion
 - d) severe anemia

Ana is 32 weeks gestation and presents with red painless vaginal bleeding.

2. You suspect:
 - a) premature separation of placenta (abruptio placentae)
 - b) placenta previa
 - c) threatened abortion
 - d) ruptured uterus
3. In this case, it is very important that you
 - a) do a vaginal exam to confirm the diagnosis
 - b) evaluate the amount of bleeding, maternal and fetal condition
 - c) induce her labor
 - d) send her home to rest

Gloria, a primigravida at 40 weeks gestation, comes to the hospital in labor. Her contractions are every five minutes and last for 40 seconds. Her cervix is dilated three centimeters, her membranes are intact, and fetal heart rate is 140/minute.

4. Your management is
 - a) allow her to ambulate freely
 - b) limit her ingestion of liquids
 - c) give her an enema
 - d) rupture her membranes
5. A partograph is used
 - a) for labors of women with high risk pregnancies
 - b) for labors in the hospital
 - c) for women with normal labors
 - d) for all women

Gloria has a spontaneous delivery of a girl who weighs three kilograms. At one minute, the baby has a weak cry and a heart rate of 120/minute. Her arms and legs are moving weakly and she responds well to external stimulation. Her hands and feet are cyanotic but her body is pink.

6. What Apgar score would you give this baby?

- a) 3
- b) 5
- c) 7
- d) 9

7. The actions you take to care for Gloria after the birth of the baby are:

- a) apply strong traction on the cord to assist with delivery of the placenta
- a) look for signs of placental separation: uterine contractions, descent of the uterus and a gush of blood from the vagina
- b) discard the placenta and membranes without examining them
- d) vigorous massage the uterus

Maria is a primigravida who comes to the hospital at 37 weeks gestation. She has been in labor for 6 hours and her cervix is dilated 3 cms. She has a headache and her blood pressure is 140/95.

8. What actions or decisions do you take?

- a) tell her to take iron tablets every day
- b) give her an analgesic and tell her to walk
- c) admit her to deliver
- d) send her home

Elizabeth is a multigravida who comes for prenatal care at 36 weeks gestation.

9. You suspect that she has a breech presentation. Why?

- a. because the head can be felt in the top of the uterus
- b. because you can hear the fetal heart tones above the pubis
- c. because on vaginal exam you feel a hard presenting part
- d. because the uterus seems round and bulging forward

10. After delivery, Elizabeth has excessive vaginal bleeding with a well contracted uterus. What is the probable diagnosis?

- a) vaginal laceration
- b) uterine atony
- c) endometritis
- a) ruptured uterus

Juana delivered five days ago. She now has a fever (38.2 degrees centigrade), pain on uterine palpation and foul smelling lochia.

11. You suspect .

- a) urinary infection
- b) breast infection
- c) endometritis
- d) appendicitis

Felipa, is an 18year old primigravida at term who is brought to the hospital with convulsions by her family.. They tell you that she has swelling in her feet, face and hands and a headache for a week.. Her blood pressure is 166/110.

12. The first action you should take;
- a) prepare for a C-section
 - b) begin treatment with epamin
 - c) begin treatment with magnesium sulfate
 - d) begin treatment with valium

Hortensia, a 17 year old primigravida at term, is brought to the hospital by the comadroma (TBA) because she ruptured her membranes more than 24 hours ago but has no labor pains. Her temperature is 36.3.

13. The appropriate management for Hortensia is:
- a) prepare for a C-section
 - b) begin treatment with antibiotics
 - c) induce labor
 - d) begin treatment with cortico-steroids

Eugenia, a 19, year old primigravidaat 32 weeks gestation by LMP (last menstrual period) and FH (fundal height), is brought to the hospital by the comadrona (TBA) because her membranes ruptured more than 24 hours ago but has not labor pains. Her temperature is 36.3.

14. The appropriate management of Eugenia:
- a) induce labor
 - b) begin treatment with cortico-steroids
 - c) prepare for a C-section
 - d) tell her to return home and wait for labor

Liliana, a multipara with 5 live children, is brought to the hospital by the comadroma (TBA) because her placenta has not delivered yet and she is bleeding excessively. Her blood pressure is 80/40.

15. The most important thing to do first in the management of Liliana is:
- a) give her an injection of methergine
 - b) give her an injection of penicillin
 - c) start an intravenous and give her a liter of Hartmans solution
 - d) prepare for a dilation and curettage

Graciela, a multigravida with 4 living children, comes to the hospital with her 2 day old newborn who is small and weak. When you examine the newborn, you note that he weighs 2200g (4 pounds). He is healthy and is not dehydrated.

16. The appropriate managment of this newborn is
- a) exclusive breat feeding
 - b) cow's milk with a bottle
 - c) oral hydration and vitamins
 - d) atol of incaparina (a local beverage)

16. The best way to keep a low birth weight baby warm is:
- a) warm box or beneath heat source
 - b) skin to skin contact with mother with both covered.
 - c) incubator
 - d) keep it warm

Alicia, a primigravida who just has had a birth, is brought to the hospital by the comadrona (TBA) because she has a laceration. She is not bleeding much

18. the most important thing in the management of Alicia is:
- a) Scold her because she did not have a hospital delivery
 - b) Determine her blood group and Rh
 - c) Insert a foley
 - d) Examine her to see if the laceration is into her rectum

Rafaela, a 19 year old primigravida at term was brought tot he hospital by the comadroma (TBA) because she has been in labor for 12 hours . Her cervical dilatation is 3 centimeters and her membranes are intact

19. The most appropriate management for Rafaela is:
- a) prepare for a C-section
 - b) give her an injection to sedate her
 - c) give her an injection of ampicillin
 - d) prepare an infusion of oxytocin to augment her labor

Doña Carmen comes to the hospital . All her other previous labors were at home

20. What actions do you take to help her to be comfortable:
- a) put out the comadrona (TBA) from hospital
 - b) wash her with cold water
 - c) give her friendly care
 - d) do not give any information to the family

21. To provide good care to a patient, you should AVOID:
- a) question her with interest
 - b) provide her with information in her own language
 - c) call her by name
 - d) judge her

Instrument - Level of Confidence

Identifying number _____

Indicate with an (X) how capable and confident you feel when you perform the following clinical skills.

		Yes	Little	No
PRENATAL CARE				
1.	To obtain medical, social and obstetric history from a pregnant woman			
2.	To calculate gestational age and expected day of delivery from last menstrual period			
3.	To perform a general physical exam			
4.	To perform an abdominal exam, including fundal height, determine fetal presentation and listening to fetal heart tones.			
5.	To perform a vaginal exam to confirm uterine size			
6.	To identify size-date discrepancies			
7.	To identify a breech presentation or transverse lei in third trimester			
8.	To identify a multiple gestation			
9.	To identify a woman with severe eclampsia			
10.	To identify a woman with hyper-reflexia			
11.	To know how to manage a woman with severe pre-eclampsia or eclampsia			
12.	To know how to identify a woman with anemia using signs and clinical symptoms			
13.	To know how to manage a woman with severe anemia			
14.	To know how to manage a woman with vaginal bleeding less than 28 weeks gestation			
15.	To know how to manage a woman with vaginal bleeding at more than 28 weeks gestation			
16.	To know how to manage a woman with premature rupture of membranes more than 12 hours			
CARE DURING LABOR AND DELIVERY				
1.	To monitor and follow a woman in labor care			
2.	To care for a woman in labor			
3.	To complete partograph			
4.	To identify a woman with abnormal labor			
5.	To manage oxytocin in a pregnant woman whose labor is being induced or augmented			
6.	To attend a normal delivery			
7.	To attend a breech delivery			
8.	To attend a twin delivery			
9.	To deliver the placenta			
10.	To identify the laceration after delivery			
11.	To repair an episiotomy or laceration			
12.	To estimate blood loss			
13.	To manage a postpartum hemorrhage due to atony			
14.	To perform internal bimanual compression for atony			
15.	To perform manual removal of placenta			
16.	To manage a woman in hypovolemic shock			

		Yes	Little	No
CARE OF NEWBORN				
1.	To determine if a newborn needs resuscitation			
2.	To perform neonatal resuscitation			
3.	To care for a low birth weight newborn			
4.	To identify a newborn with sepsis			
POSTPARTUM CARE				
1	To identify a woman with endometritis			
2.	To identify a woman with breast infection			
3	To manage a newborn with sepsis			
ONLY DOCTORS				
1	To manage a woman with endometritis			
2	To manage a woman with breast infection			
3	To manage a newborn with sepsis			

Assessment of Skills

Identifying number _____

Station A: USE OF PARTOGRAPH (Enclose a copy of partograph)

CASE

Josefa López came on foot to the hospital at 6 AM on the December 25th. She was accompanied by her husband and her mother-in law. This was her first child. She complained that she has had labor pains for the last 12 hours. She says that her membranes have not ruptured. "I am worried because the birth is delayed . My last menstrual period began March 20th. You welcome her and examine her.

On exam, you find the following:

The contractions are coming every 3-4 minutes and last 20-30 seconds. Her vital signs are BP PA 110/70 P 88 T 36.2 degrees, FHT 148, vertex presentation with head in first plane. On vaginal exam, you find the cervix is dilated 2 cm.

		Yes	Inc	No
1	Fills out the initial information on the partograph			
	a) name and prenatal number			
	b) date and time of admission			
	c) status of membranes			
	d) determines if preterm or term			
2	Notes observations			
	a) in the correct place on partograph			
	b) blood pressure			
	c) pulse			
	d) temperature			
	e) FHT			
	f) frequency of contractions			
	g) duration de contractions			
	h) presentation fetal			
	i) descent of head			
	j) cervical dilation l			
3	Determine plan of action			
	a) calm her			
	b) rest or walk if she wants			
	c) oral liquids			

At 9:00 AM, You repeat the vaginal exam and find the cervix is dilated to 4 cms, the membranes are intact and the head is in the first plane. The contractions are coming every 3 minutes and lasting 45 seconds. The FHT is 144/min; vital sigs are BP 115/75 P 80, T 36.1 degrees

		Yes	Inc	No
4.	Notes observations			
	a) in the correct place on the partograph			
	b) blood pressure			
	c) pulse			
	d) temperature			
	e) FHT			
	f) frequency of contractions			
	g) duration de contractions			
	h) descent of head			
	i) cervical dilation cervical			
	j) status of membranes			
5	Determine a plan of action			
	a) ambulate			
	b) allow to drink fluids			
At 11AM, your exam reveals that the cervix is dilated 5 cms. During the exam, the membranes rupture with clear amniotic fluid. The head is now in the second plane; FHT is 140/min, and the contractions are every 2 minutes for 50 seconds. Vital signs are BP 120/75 P 84, T 36.6 degrees. She says that she wants to continue to walk.				
6	Notes observations			
	a) in the correct place on partograph			
	b) pulse			
	c) temperature			
	d) FHT			
	e) frequency of contractions			
	f) duration de contractions			
	g) descent of head			
	h) cervical dilation cervical			
	i) staus of membranes & color of fluid			
	j) time of rupture of membranes			
7	Determine a plan of action			
	a) have her lie on her left side			
	b) monitor FHT			
	c) monitor the progress of her contractions			

At noon, Joesfa says that she wants to go to the bathroom. On exam, she is 10 cms dilated and the head is in the third plane. FHT 152/min, vital signs BP 110/60, P 92, T 36.3 degrees.

		Yes	Inc	No
8.	Record your observations			
	a) in the correct place on partograph			
	b) blood pressure			
	c) pulse			
	d) FHT			
	e) descent of head			
9.	Interpret the curve on partograph			

Station B: Breech Delivery

Sra. Tiburcia Cux is brought to the hospital by the comodrona (TBA) because the baby is not coming. The patient is a 29 year old farmer with 7 children. She is at term, according to your calculations. ..On exam, you find that she is pushing and the buttocks of the baby are at vulva FHT are 150/min. At this time, you do not have a operating room because it is used for a trauma case

Describe your management of Sra Cux. Use the model but imagine that this is a real woman..

		Yes	Inc	No
1.	Call for help			
2.	Calm her and tells her what he/she is going to do			
3.	Perform an abdominal exam to determine if there is a second fetus			
4.	Perform a vaginal exam to verify full dilation and rule out prolapsed cord			
5.	Wrap the fetal parts that have delivered with a towel to protect the fetus from cold			
6.	Do not pull on the baby until the abdomen is delivered to level of the umbilicus			
7.	Monitor the fetal heart rate			
8.	Assure correct rotation of the head to maintain occiput anterior			
9.	Maintain a flexed head by applying suprapubic pressure			
10.	Evaluate if you need an episiotomy			
11.	If the head does not come, introduce the fingers into the vagina to assist with flexion			
12.	Prepare to resuscitate newborn			

Station C: Neonatal Resuscitation

CASE

Sra Tiburcia's male baby was a breech delivery. When you receive the baby, you observe that he is not crying, has little movement in his arms and legs, his grimace is weak, his body and face are blue and his heart rate is 90. Describe how you will care for this newborn. Use the model but imagine that this is a real baby.

		YES	INC	NO
1.	Clear the airway, position, and suction			
2.	Dry and cover (to reduce heat loss) the newborn while stimulating			
3.	Evaluate if his is breathing (he is not breathing)			
4.	Take the pulse (use cord if you do not have a stethoscope) (90)			
5.	Evaluate the APGAR (APGAR 3)			
6.	Call for help			
7.	Begin resuscitation (mouth to mouth or ambu with oxygen at 10 L/min			
8.	Verify that you are inflating the lungs/listen with stethoscope			
9.	Keep the baby covered to prevent heat loss			
10.	Check the heart rate (80)			
11.	Begin cardiac resuscitation: a) position of the fingers b) pressure of the compression c) coordinate with respiratory resuscitation (5 to one)			
12.	Continue cardiac resuscitation until heart rate is at least 80 and the breathing is spontaneous			
13.	Continue to keep warm, oxygen and stimulation until he is pink.			
14.	Return him to his mother for breast feeding and warmth			
15.	Explain to her what you did			

Station D: Management of Postpartum Hemorrhage

CASE

La Sra. Rosario is a 35-year old patient and the mother of 6 children, who delivered at 5 a.m. this morning in her home without problems. She delivered a beautiful 8 pound baby. Afterwards, she said the placenta delivered normally, but since then she has been bleeding intermittently. Her husband and her mother decided to bring her to the hospital at 9 AM in the morning. Rosario arrived conscious and plaintive, somewhat pale. On abdominal palpation, the uterus was soft and enlarged. Describe your management of Sra. Rosario. Use the model but imagine that this is a real woman.

		YES	INC	NO
1.	Explain to Rosario what is happening and what you are going to do.			
2.	Massage the uterus and expel the clots			
3.	Call for help			
4.	Cover her			
5.	Start an Intravenous with 1000cc ringer's and 40 units of oxytocin			
6.	Take her pulse and BP			
7.	Give her Methergine 0.2mg IM (if she is not hypertensive)			
8.	Make sure her bladder is empty (insert Foley catheter if necessary)			
9.	Evaluate if her fundus is firm			
10.	Begin external bimanual compression if she continues with atony or bleeding			
11.	If the uterus does not contract, begin internal bimanual compression.			
12.	Monitor pulse, BP and uterine fundus every 30 minutes until stabilized and uterus remains contracted			
13.	Reassure the patient and her family			
14.	Ask for a blood group and RH			

Audit of Complicated Care

IDENTIFYING NUMBER _____

DESCRIBE THE LAST MATERNAL OR NEWBORN COMPLICATED CASE THAT YOU CARED FOR.

1. What was the reason that the case came to you?
2. What actions did you take to make the diagnosis?
3. What was the diagnosis?
4. What was your management?
5. What was the result?

Only for providers with training (TRAINED 1)

6. Did the training help you resolve the case: Explain your answer:

Appendix B

Detailed Results

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Table B-1 Absolute (Percent) Mean Scores for Level of Confidence in Performing Selected Skills by Facility								
Skill Category	Total Possible Points	Sololá N=9	Totonicapán N=8	San Marcos N=6	Retalhuleu N=6	Suchitepéquez N=16	Quiche N=25	P Value
Prenatal care	32	26.7 (83%)	24.0 (75%)	23.7 (74%)	22.3 (70%)	26.4 (83%)	20.7 (65%)	0.21
Care during labor	32	27.6 (86%)	25.4 (79%)	26.3 (83%)	26.0 (81%)	26.2 (82%)	20.9 (65%)	0.1
Newborn care	8	7.0 (88%)	7.0 (88%)	7.5 (94%)	6.5 (82%)	6.9 (87%)	5.5 (69%)	0.05
Postpartum care	4	3.2 (81%)	3.4 (84%)	3.3 (83%)	3.8 (95%)	3.8 (95%)	2.8 (69%)	0.16
Total score	76	64.4 (85%)	59.8 (79%)	60.8 (80%)	58.7 (77%)	63.3 (83%)	49.8 (66%)	0.12

Table B-3 Absolute (Percent) Mean Scores in Application of Skills by Facility						
Skill Category	Total Possible Points	Sololá N=8	Totonicapán N=8	San Marcos N=5	Quiche N=24	P Value
Partograph	50	42.3 85%	36.1 73%	46 92%	12.3 25%	<0.001
Breech delivery	24	11.3 47%	9.9 41%	12.2 51%	7.5 31%	0.06
Newborn resuscitation	40	23.0* 58%	22.8* 57%	22.4 56%	20.3 51%	0.26
Postpartum hemorrhage	28	19.7 70%	21.3 76%	21.2 76%	16.2 58%	0.04
OVERALL SCORE	142	64% *	61% *	69%	41%	<0.001

* N=8 in Sololá

**Table B-2
FREQUENCY DISTRIBUTION AMONG RESPONDERS WHO FELT CONFIDENT IN PERFORMING SELECTED SKILLS**

		TRAINED 1 N=23	TRAINED 2 N=22	BASELINE N=25	P VALUE
PRENATAL CARE					
1	To obtain medical, social, and obstetrical history from a pregnant woman	65%	73%	36%	0.03
2	To calculate gestational age and expected day of delivery from last menstrual period	74%	96%	72%	0.09
3	To perform a general physical exam	70%	64%	72%	0.82
4	To perform an abdominal exam, including calculating fundal height, determining fetal presentation, and listening to fetal heart tones	87%	86%	72%	0.32
5	To perform a vaginal exam to confirm uterine size	39%	36%	24%	0.49
6	To identify size-date discrepancies	52%	64%	48%	0.54
7	To identify a breech presentation or transverse lie in third trimester	52%	50%	56%	0.92
8	To identify a multiple gestation	35%	46%	28%	0.46
9	To identify a woman with severe pre-eclampsia	96%	82%	56%	0.004
10	To identify a woman with hyper-reflexia	44%	14%	32%	0.09
11	To know how to manage a woman with severe pre-eclampsia or eclampsia	83%	77%	44%	0.008
12	To know how to identify a woman with anemia using signs and clinical symptoms	100%	82%	80%	0.08
13	To know how to manage a woman with severe anemia	65%	73%	60%	0.65
14	To know how to manage a woman with vaginal bleeding less than 28 weeks gestation	61%	68%	48%	0.36
15	To know how to manage a woman with vaginal bleeding at more than 28 weeks gestation	61%	68%	48%	0.36
16	To know how to manage a woman with premature rupture of membranes more than 12 hours	74%	77%	44%	0.03
CARE DURING LABOR AND DELIVERY					
1	To monitor and follow a woman in labor care	91%	91%	68%	0.05
2	To care for a woman in labor	96%	96%	80%	0.12
3	To complete a partograph	70%	68%	44%	0.13
4	To identify a woman with abnormal labor	96%	6%	60%	<0.001
5	To manage oxytocin in a pregnant woman whose labor is being induced or augmented	78%	77%	56%	0.16
6	To attend a normal delivery	91%	100%	84%	0.15
7	To attend a breech delivery	44%	50%	24%	0.16
8	To attend a twin delivery	57%	46%	32%	0.23
9	To deliver the placenta	91%	100%	80%	0.07
10	To identify laceration after delivery	83%	91%	64%	0.07
11	To repair an episiotomy or laceration	70%	82%	60%	0.27
12	To estimate blood loss	87%	86%	64%	0.09
13	To manage a postpartum hemorrhage due to atony	65%	68%	44%	0.18
14	To perform internal bimanual compression for atony	48%	18%	8%	0.004
15	To perform manual removal of placenta	35%	23%	16%	0.31
16	To manage a woman in hypovolemic shock	65%	55%	36%	0.12
CARE OF NEWBORN					
1	To determine if a newborn needs resuscitation	83%	77%	76%	0.84
2	To perform neonatal resuscitation	70%	68%	44%	0.13
3	To care for a low birth weight newborn	91%	73%	64%	0.08
4	To identify a newborn with sepsis	78%	73%	28%	<0.001
POSTPARTUM CARE					
1	To identify a woman with endometritis	83%	96%	72%	0.1
2	To identify a woman with breast infection	70%	82%	48%	0.05
		N=4	N=0	N=4	
1	To manage a woman with endometritis	100%	NA	75%	1
2	To manage a woman with breast infection	100%	NA	75%	1
3	To manage a newborn with sepsis	75%	NA	75%	1

**Table B-4
Frequency Distribution of Correct Application of the Partograph Identified in
Skill Assessment**

CASE

Josefa López came on foot to the hospital at 6 AM on the December 25th. She was accompanied by her husband and her mother-in-law. This was her first child. She complained that she has had labor pains for the last 12 hours. She says that her membranes have not ruptured. "I am worried because the birth is delayed. My last menstrual period began March 20th." You welcome her and examine her

On exam, you find the following:

The contractions are coming every 3-4 minutes and last 20-30 seconds. Her vital signs are BP PA 110/70 P 88 T 36.2 degrees, FHT 148, vertex presentation with head in first plane. On vaginal exam, you find the cervix is dilated 2 cm.

Please record the information on the partograph.

	TRAINED 1 N=22	BASELINE N=24	P Value
Fills out the initial information on the partograph			
1. name and prenatal number	86%	21%	<0.001
2. date and time of admission	82%	29%	0.001
3. status of membranes	73%	4%	<0.001
4. determines if pre-term or term	36%	0%	0.001
Notes observations			
5. in the correct place on partograph	59%	4%	<0.001
6. blood pressure	82%	13%	<0.001
7. pulse	77%	13%	<0.001
8. temperature	82%	17%	<0.001
9. FHT	77%	4%	<0.001
10. frequency of contractions	50%	4%	<0.001
10. duration of contractions	46%	4%	<0.001
11. fetal presentation	64%	4%	<0.001
12. descent of head	36%	4%	0.008
13. cervical dilatation	73%	4%	<0.001
14. status of membranes	59%	4%	<0.001
Determine plan of action:			
16. calm her	73%	54%	0.32
17. rest or walk if she wants	77%	46%	0.06
18. oral fluids	36%	25%	0.61
19. monitor her labor	86%	50%	0.03
Determine a plan of action			
20. ambulate	86%	42%	0.005
21. allow to drink fluids	77%	25%	<0.001
At 11 AM, your exam reveals that the cervix is dilated 5 cms. During the exam, the membranes rupture with clear amniotic fluid. The head is now in the second plane, FHT is 140/min, and the contractions are every 2 minutes for 50 seconds. Vital signs are BP 120/75 P 84, T 36.6 degrees. She says that she wants to continue to walk.			
Determine a plan of action			
22. have her lie on her left side	82%	50%	0.05
22. monitor FHT	96%	29%	<0.001
23. monitor the progress of her contractions	86%	29%	<0.001
At noon, Josefa says that she wants to go to the bathroom. On exam, she is 10 cms dilated and the head is in the third plane. FHT 152/min, vital signs BP 110/60, P 92, T 36.3 degrees.			
25. Interpret the curve on the partograph	100%	16%	<0.001

Table B-5
Frequency Distribution of Correct Application of Breech Delivery
Identified in Skill Assessment

Sra. Tiburcia Cux is brought to the hospital by the comodroma (TBA) because "the baby is not coming." The patient is a 29-year old farmer with seven live children. She is at term according to your calculations. On exam, you find her pushing, and the buttocks of the baby are at vulva. FHT are 150/min. At this time, you do not have an operating room because it is being used for a trauma case.

Describe your management of Sra Cux. Use the model, but imagine that this is a real woman.

		TRAINED N=22	BASELINE N=24	P Value
1	Call for help	27%	38%	0.67
2	Calm her and tell her what you are going to do	55%	25%	0.08
3	Perform an abdominal exam to determine if there is a second fetus	0%	8%	0.49
4	Perform a vaginal exam to verify full dilatation and rule out prolapsed cord	64%	25%	0.02
5	Wrap the fetal parts that have delivered with a towel to protect the fetus from cold	46%	17%	0.07
6	Do not pull on the baby until the abdomen is delivered to level of the umbilicus	36%	42%	0.95
7	Monitor the fetal heart rate	36%	29%	0.84
8	Assure correct rotation of the head to maintain occiput anterior	18%	25%	0.73
9	Maintain a flexed head by applying suprapubic pressure	36%	33%	0.92
10	Evaluate if she needs an episiotomy	14%	8%	0.66
11	If the head does not come, introduce the fingers into the vagina to assist with flexion	77%	38%	0.02
12	Prepare to resuscitate the newborn	73%	38%	0.04
13	Has delivered a woman with a breech presentation	73%	71%	0.86

**Table B-6
Frequency Distribution of Correct Application of Newborn Resuscitation
Identified in Skill Assessment**

Sra Tiburcia's male baby was a breech delivery. When you receive the baby, you observe that he is not crying, has little movement in his arms and legs, his grimace is weak, his body and face are blue, and his heart rate is 90.

Describe how you will care for this newborn

		TRAINED 1 N=21	BASELINE N=24	P Value
1	Clear the airway, position, and suction	95%	71%	0.05
2	Dry and cover (to reduce heat loss) the newborn while stimulating	48%	8%	0.008
3	Evaluate if he is breathing (he is not breathing)	33%	29%	0.98
4	Take the pulse (use cord if you do not have a stethoscope) (90)	29%	8%	0.12
5	Evaluate the APGAR (APGAR 3)	67%	8%	<0.001
6	Call for help	43%	46%	0.92
7	Begin resuscitation (mouth to mouth or ambu with oxygen at 10 L/min	71%	29%	0.01
8	Verify that you are inflating the lungs/listen with stethoscope	29%	8%	0.12
9	Keep the baby covered to prevent heat loss	71%	42%	0.09
10	Check the heart rate (80)	33%	25%	0.78
11	Begin cardiac resuscitation			
	a) position of fingers	5%	0%	0.47
	b) pressure of the compression	24%	8%	0.22
	c) coordinate with respiration	24%	13%	0.44
12	Continue cardiac resuscitation until heart rate is at least 80 and the breathing is spontaneous	67%	17%	0.002
13	Continue to keep warm, oxygen, and stimulation until he is pink	91%	21%	<0.001
14	Return him to his mother for breastfeeding and warmth	33%	42%	0.79
15	Explain to her what you did	62%	100%	<0.001
16	Does not begin resuscitation with intubation	81%	100%	0.04
17	Does not begin resuscitation with cardiac massage	67%	100%	0.002
18	Does not begin resuscitation with inserting an intravenous	86%	96%	0.32

Table B-7
Frequency Distribution of Correct Application of Postpartum Hemorrhage Management Identified in Skill Assessment

CASE

Sra. Rosario is a 35-year old patient and the mother of six children, who delivered at 5 AM this morning in her home without problems. She delivered a beautiful 8 eight pound baby. Afterwards, she said the placenta delivered normally, but since then she has been bleeding intermittently. Her husband and her mother decided to bring her to the hospital at 9 a.m. in the morning. Rosario arrived concious and , somewhat pale. On abdominal palpation, the uterus was soft and enlarged. Describe your management of Sra. Rosario.

		TRAINED 1 N=22	BASELINE N=24	P Value
1	Explain to Rosario what is happening and what you are going to do	96%	79%	0.23
2	Massage the uterus and expel the clots	82%	50%	0.05
3	Call for help	96%	88%	0.61
4	Cover her	50%	42%	0.79
5	Start an Intravenous with 1000 cc ringer's and 40 units of oxytocin	73%	50%	0.2
6	Take her pulse and BP	96%	88%	0.61
7	Give her Methergine 0.2mg IM (if she is not hypertensive)	73%	58%	0.48
8	Make sure her bladder is empty (insert Foley catheter if necessary)	0%	0%	1
9	Evaluate if her fundus is firm	0%	4%	1
10	Begin external bi-manual compression if she continues with atony or bleeding	86%	46%	0.01
11	If the uterus does not contract, begin internal ,bimanual compression	32%	25%	0.85
12	Monitor pulse, blood pressure, and urine fundus every 30 minutes until stabilized and uterus remains contracted	77%	38%	0.02
13	Reassure the patient and her family	86%	38%	0.002
14	Ask for a blood group and RH	82%	67%	0.4

Appendix C

Details of Complicated Case Audits

Details of the Complicated Cases

Complications managed by the trained providers

- Shoulder dystocia, depressed newborn—successful neonatal resuscitation by the nurse
 - Three postpartum hemorrhages managed by nurses; Two due to vaginal lacerations repaired by the nurses
 - Uterine inversion with shock—resuscitation with active participation by auxiliary nurse
 - Two fetal distress in labor—One vaginal birth with resuscitation by nurse auxiliary and other resulted in C-section—nurse auxiliary felt the training helped her to identify the fetal distress
 - Vaginal delivery after previous C-section managed successfully by the nurse auxiliary
 - Three breech presentations in labor that were cared for by the auxiliary nurses before the physician arrived
 - Three cases of cephalo-pelvic disproportion identified by the nurse auxiliaries using the partograph, which aided in the diagnosis by the physician—Two women had appropriate C-sections and one had a difficult, forceps delivery that resulted in neonatal death
 - Retained placenta successfully managed with manual removal, a skill the physician learned in training
 - Placenta previa with active hemorrhage; She was recognized and managed appropriately by the nurse auxiliary before the physician arrived—she had a C-section with good outcome for mother and baby
- Four cases of severe pre-eclampsia/eclampsia; one with cerebral edema and other with renal failure postpartum. Three were managed appropriately initially by nurses
- Breech presentation and fetal death. When the nurse auxiliary felt the head, it felt very big—the physicians came eventually and felt it was necessary to do a C-section. The stillbirth had meningomyocele and hydrocephalus
- Labor with premature rupture of membranes and fetal distress—the nurse auxiliary felt that the training made her more confident to care for the newborn who weighed 4½ pounds and was probably small for gestational age

Complications managed by providers who have not had training (BASELINE)

- Prolonged labor with transverse lie, fetal death ruptured uterus, shock—required transfusion and hysterectomy
- Dysfunctional labor that was augmented with oxytocin, resulting in hyperstimulation—in spite of the worry of the nurse, the augmentation continued and, at birth, the baby was severely depressed and subsequently died due to complications of asphyxia

- Two cases of severe pre-eclampsia/eclampsia—one was a 16-year old woman who arrived in a coma and was diagnosed with “hysteria.” She was admitted but not managed appropriately 24 hours after admission, the woman and fetus died before delivery; the second was treated and had a good outcome
- Postpartum hemorrhage with shock after home birth—maternal death
- Two cases of shoulder dystocia—One baby weighed 12 pounds after the mother was incorrectly diagnosed with twins. The doctor was only able to resolve the case by decapitating the baby and extracting the body in a C-section. The second was a boy who weighed 8 lbs. 4 oz and needed resuscitation but had an APGAR of 7 at one minute and 10 at five minutes. No problems resulted
- Two cases of ruptured uteri with fetal death—one was a 19-year old primgravid with ruptured uterus and fetal death after manipulation by the comadrona (TBA); She was managed in the hospital and had a hysterectomy. The other case was a primgravid referred postpartum and died during surgery
- One case of premature rupture of membranes that was treated by the comadrona (TBA); She treated her with good results for mother and baby
- Four breech deliveries with one fetal death due to retained head
- Three cases dystocias—two were multiple presentations (head and hand). One resulted in C-section and the other delivered a depressed newborn vaginally The third was admitted with transverse lie and prolapsed arm. She had a vaginal delivery that resulted in a perinatal death and maternal endometritis
- Seven neonatal cases—one died after admission with asphyxia, one died after labor induction and hyperstimulation; Two had asphyxia; and two had neonatal convulsions
- Four providers said that they had not managed any complications