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Maternal and Child Health
Integrated Program

Formative Research to Assess the View of Health Care Providers in Nicaragua on the Mode of Childbirth in "Low-Risk" Pregnancies

Final Report

May 2012

UNICEM
Unidad de Investigación Clínica y Epidemiológica Montevideo

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Abbreviations and Acronyms

CAMBIO	Changing active management behavior in obstetrics
IECS	Institute for Clinical Effectiveness and Health Policy
INSS	Nicaraguan Social Security Institute
MCHIP	Maternal and Child Health Integrated Program
MINSA	Ministry of Health/Ministerio de Salud
PATH	Program for Appropriate Technology in Health
SONIGOB	Sociedad Nicaraguense de Ginecología y Obstetricia (Nicaraguan Society of Gynecology and Obstetrics)
UNICEM	Unidad de Investigación Clínica y Epidemiológica MONTE (Clinical and Epidemiological Research Unit, Montevideo)
USAID	United States Agency for International Development
WHO	World Health Organization

Acknowledgments

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About MCHIP
The Maternal and Child Health Integrated Program (MCHIP) is the USAID Bureau for Global Health's flagship maternal, neonatal and child health (MNCH) program. MCHIP supports programming in maternal, newborn and child health, immunization, family planning, malaria and HIV/AIDS, and strongly encourages opportunities for integration. Cross-cutting technical areas include water, sanitation, hygiene, urban health and health systems strengthening.

Executive Summary

BACKGROUND

Latin America is probably the region with the highest cesarean birth rate, ranging from 25% to 30% of all births. A World Health Organization (WHO) study found that women undergoing cesarean operations that were not medically necessary were more likely to die or be admitted into intensive care units, require blood transfusions or encounter complications that led to hysterectomies. In Nicaragua, the cesarean birth rate has quadrupled over the last two decades, with significantly higher rates in the most urbanized locations.

PURPOSE

The goal of this formative research was to explore *birth attendants' (physicians' and midwives') attitudes toward cesarean birth in Nicaragua, with the aim to collaborate in the design of a feasible and culturally appropriate intervention to decrease cesarean birth rates.*

METHODS

A formative research evaluation was conducted with birth attendants from the public and private sectors and at the managerial level in order to understand the barriers and facilitators that determine the use of cesarean operations. In-depth interviews and focus groups were conducted in hospitals of Managua City and León.

FINDINGS

Participants in the study identified the following factors that influence high cesarean birth rates in Nicaragua:

Provider-related factors:

- Belief that women with a history of a previous cesarean birth will always require a cesarean. This was the primary reason given for performing a cesarean operation in a "low-risk" woman (some informants stated that six out of 10, or even eight out of 10, cesarean operations are performed because of a previous cesarean). Many of the providers stated that they would not attempt a trial of vaginal birth in a woman with a history of previous cesarean because of the lack of clear guidance or protocols for managing birth after a cesarean.
- Fear of litigation and/or the perception that litigation can be avoided by performing a cesarean operation.
- Inadequate human and material resources (gynecologists, equipment, surgical block):
  - Leads to the choice to perform a cesarean to reduce work hours
  - Makes monitoring the woman in labor challenging and leads to the choice to perform a cesarean because of the belief that inadequate monitoring could increase the risk of not identifying complications in a timely fashion
- Perception that benefits of cesarean operations outweigh potential risks, and that critics of high cesarean rates do not adequately consider benefits for perinatal outcomes.
- Differential payment for cesarean operations in the private sector.
- Perception that cesarean birth can reduce risk and prevent complications in women who live in isolated areas and may not have timely access to specialists when needed.

- Health care providers' knowledge and skills are not regularly updated.

Patient-related factors:

- Distrust of obstetric providers.
- Increased demand by women/family for cesarean birth.
- Lack of preparation for labor and childbirth.

Institution-related factors:

- Need for surgical experience for medical residents in teaching hospitals. There may be "softer" criteria for performing a cesarean operation in teaching hospitals because the surgery is also done for academic purposes.
- Teaching hospitals are referral hospitals and manage "high-risk" obstetric patients who are referred from peripheral facilities and may be more likely to require cesarean operations.
    - Lack of clear protocols/guidelines for cesarean operations, and/or lack of awareness of protocols/guidelines.
- Lack of a structured program for continuing education for providers—practicing physicians are not kept up-to-date.
- Management systems that do not include audits to evaluate indications for cesarean and cesarean birth rates, and provide feedback to providers about quality of care.
- Limited human, technical and material resources (gynecologists, equipment, surgical block).

Participants identified potential interventions that could reduce cesarean birth rates, including preparation of women for childbirth, strengthening efforts to de-medicalize childbirth, developing and disseminating clinical guidelines, providing regular clinical updates for providers, tort reforms to reduce the practice of defensive medicine, reduction of fee differentials for cesarean birth, improved working conditions, initiation of quality improvement interventions for cesarean and support for obstetrician/gynecologists.

CONCLUSIONS

While there appear to be information gaps on the part of providers and patients about risks and benefits of vaginal and cesarean birth and indications for cesarean birth, the findings do support the assumption that, in most cases, obstetrician/gynecologists seek to implement best practices and act with the intent to assure maternal and perinatal safety. Practicing obstetrician/gynecologists made it clear that they require evidence, tools and support to assess their practices and implement recommended guidelines.

RECOMMENDATIONS

Given that individual interventions have not by themselves resulted in reduced cesarean births and the fact that identified causes of unnecessary cesarean birth in Nicaragua are multifactorial, the study team feels that the cesarean birth rate can be safely reduced in Nicaragua by implementing multifaceted strategies that address health systems, provider and patient factors. As a first step in responding to findings of the study and developing recommendations for potential interventions, the Ministry of Health (Ministerio de Salud, MINSA) will use findings from the report to update guidelines and clinical protocols for obstetric care, including indications for performing a cesarean and protocols for mode of childbirth after a cesarean.

Additional strategies will need to be implemented to address other provider factors, health system factors and patient factors. Multiple strategies exist for reducing rates of unnecessary cesarean operations, some of which could feasibly be implemented in a resource-constrained country such as Nicaragua and address the issues identified in the formative research. A strategy similar to the intervention to **c**hanging providers' application of **a**ctive management of the third stage of labor **i**n **o**bstetrics (CAMBIO), would be the most likely to succeed in addressing provider factors affecting the cesarean rate in Nicaragua as it involves health care providers in analyzing and modifying their practice.

Background

Over the last 30 years, a rise in the incidence of cesarean births has been observed. [1-6] Latin America is probably the region with the highest cesarean birth rate, ranging from 25% to 30% of all births. [7] When cesarean operations are performed safely and for an appropriate obstetrical or medical indication, they are potentially lifesaving procedures for the woman and her baby. Unfortunately, in many settings, women are increasingly undergoing cesarean operations without any obstetrical or medical indications, contributing to the worldwide trend toward higher rates of cesarean births. [8-9] Many women and health care providers believe that the relative safety of the surgery means it is as safe as vaginal birth, and can therefore be practiced as an elective procedure in the absence of obstetrical or medical indications. This is certainly not the case. A World Health Organization (WHO) study found that women undergoing cesarean operations that were not medically necessary were more likely to die or be admitted into intensive care units, require blood transfusions or encounter complications that led to hysterectomies. [10] The same study found that, compared to spontaneous vaginal birth, assisted vaginal birth (forceps or vacuum extraction), antepartum cesarean operation with indications and any intrapartum cesarean operation were associated with an increased risk of severe perinatal outcomes, except in cases of breech presentation, when cesarean birth was associated with a reduced risk of severe perinatal outcome.

Cesarean birth rates seem to vary by country, states within a country, type of facility (private versus public) and the level and type of health care provider.[11] Over the last two decades, there have been attempts to reduce the rate of cesarean births to rates that reflect possible obstetrical and medical indications (approximately 10–15%).[12] Audits, feedback and multifaceted strategies,[13-16] in addition to requiring a second opinion[17] before performing surgery, are considered useful interventions for reducing cesarean operation rates. Although attempts to reduce cesarean birth rates have been published, [18-19] very few were evaluated through randomized controlled trials, and none have been carried out in Latin America.

The struggle to ensure that women have access to needed technologies, balanced with governments' need for rational health care services and the promotion of evidence-based practices, translates into a need to understand root causes for high cesarean birth rates. To improve the effectiveness of these interventions and design interventions that address the root causes for high rates, it would be useful to fully understand the determinants of cesarean birth in each setting. The following study attempts to study providers' perceptions of cesarean births with the hope that an intervention can be developed to address high cesarean birth rates in Nicaragua.

In Nicaragua, the rate of cesarean births has quadrupled over the last two decades; with the rate being significantly higher in the most urbanized settings. According to the National Demographic and Health Survey (ENDESA 2006/07), [20] one of every three births reported by surveyed women was by cesarean in the following locations: Granada (32%), Managua (31%), León (31%) and Carazo (31%). All of these territories (known as departments in Nicaragua) are located in the Pacific Region, where 70% of the Nicaraguan population lives. On the other extreme, the Caribbean coastal region covers almost half of the national territory, but only 10% of the national population lives there. In this flat, lowland region with abundant rain and large rainforests, the cesarean birth rate is low. Based on the ENDESA of 2006/07,[20] only 5% of women reported having had a cesarean birth in the territory known as the North Atlantic Autonomous Region (NAAR), and 9% in the territory known as the South Atlantic Autonomous Region (SAAR). On average, the country's cesarean birth rate went from 7% in 1992 to 19% in 2006/07.[20] A WHO health facility-based survey in 2004–2005 revealed that the overall cesarean birth rate for Nicaragua was 30.8%. [21]

It is important to understand the health system of Nicaragua when studying the cesarean birth rate. The Ministry of Health (Ministerio de Salud, MINSA) is both a regulatory agency and a provider of health services. Legally speaking, it is the government institution designated to lead the health sector and set regulations for all public and private health facilities and providers. All private health facilities and obstetrics and gynecology specialists are certified by the MINSA. The National University of Nicaragua, a public institution, with main campuses in the cities of León and Managua, is responsible for the academic training for all medical specializations, including obstetrics and gynecology.

There has been noticeable health sector growth outside the MINSA during the last decades. The Nicaraguan Social Security Institute (INSS) is the largest insurance provider for both public and private sector employees, insuring almost half a million people.[22] The INSS manages the financial portfolio, supervises the quality of the provisional clinics, and covers approximately 15%of the Nicaraguan population. INSS does not have its own clinics or directly provide any health services, but rather sub-contracts services from around 40 health facilities across Nicaragua (mostly from private providers, but also from public facilities). Finally, although the private sector has been growing steadily in recent years and includes approximately 200 health facilities, most of the private sector facilities are in Managua.

Study Methodology

GOAL

The goal of this formative research is to *explore birth attendants' (physicians', and midwives') attitudes toward cesarean birth in Nicaragua with the aim to collaborate in the design of a feasible and culturally appropriate intervention to decrease cesarean birth rates.*

OBJECTIVES

1. To identify factors that determine the adoption of evidence-based recommendations in obstetric practice by birth attendants
2. To assess birth attendants' opinions and attitudes regarding cesarean birth, including:
    a. Understanding of obstetrical and medical indications for cesarean birth
    b. Factors, beyond obstetrical and/or medical indications, that affect the decision to perform a cesarean operation (factors for and against performing a cesarean operation)
    c. Perception of risks and benefits of cesarean birth
    d. Views on women's preferences with respect to the mode of childbirth
3. To assess birth attendants' and upper level administrators' knowledge and opinions regarding cesarean birth rates in Nicaragua and the rest of the world, including:
    a. Factors affecting the cesarean birth rates
    b. The cesarean birth rate they consider to be their gold standard
    c. Health-related consequences of overuse of cesarean operations
4. To assess birth attendants' opinions about interventions that could be useful for decreasing cesarean birth rates in their settings

ETHICAL APPROVAL

The PATH research ethics committee (REC) reviewed the study protocol and determined that this activity was not research and did not require submission to the committee for review. The study protocol was therefore not submitted to any other ethics committees for review or approval.

METHODS

To achieve the objectives, qualitative research was conducted. In-depth, comprehensive information was gathered through open ended questions during focus group discussions and in-depth interviews that provided direct quotations. The information was gathered to gain insight on perceptions and attitudes toward cesarean birth and to understand the behavior and motivations of obstetrician/gynecologists. The subjective information gathered helped describe the context of the variables affecting high cesarean birth rates, as well as the interactions of the different variables in the context. The context is defined as a system of social and institutional relationships in which there is a shared pattern of perceptions about pregnancy, childbirth, interventions and medical liability, as well as a set of guidelines and operating constraints.

The objective of this research was to assess the determinants of high rates of cesarean births, gather the opinions of health care providers and obstetric decision-makers at local and central levels on possible barriers and facilitators to ensure optimum cesarean birth rates, and collectively develop useful recommendations for the development of a plan to promote rational use of cesarean operation.

Focus groups were conducted with obstetrician/gynecologists from different sectors of the health care system in Nicaragua—both MINSA and INSS hospitals. The choice of participants was based on the need for multiple viewpoints from physicians who work in different sectors of the health care system, with different social and institutional realties. Although the intention had been to include midwives in focus group discussions, in the end they were not included as they neither perform nor influence the decision to perform cesarean operations.

In-depth interviews were conducted with health authorities, professionals involved in management and decision-making in maternal health, and those who carry out development plans and public health policies. These professionals were hospital directors, senior officers of the MINSA and senior officials of the Nicaraguan Society of Gynecology and Obstetrics (Sociedad Nicaraguense de Ginecología y Obstetricia—SONIGOB).

STUDY POPULATION

The study population consisted of obstetrician/gynecologists, and health administrators who act as decision-makers in hospitals and the MINSA, INSS and SONIGOB.

PARTICIPATING INSTITUTIONS

The health care institutions included in the study are MINSA and INSS facilities located in Managua City and León City.

Focus group participants from the hospitals were recruited by a team member who invited the participation of obstetrician/gynecologists from the active staff of the service. Focus groups were conducted with a maximum of six participants and a minimum of three participants.

Four focus groups and seven in-depth interviews were conducted, involving a total of 26 health care professionals. Seventeen of the health care professionals were obstetrician/gynecologists, six were

professionals with decision-making responsibilities at the local level and three were professionals at the central level. Table 1 outlines socio-demographic characteristics of the participants.

In the city of Managua, focus groups were conducted in:

- Hospital Militar (MINSA and INSS)—four participants
- Hospital Bertha Calderón (MINSA)—three participants
- Hospital Alemán (MINSA)—four participants

In the city of León, six participants participated in the focus group that was conducted in Hospital Heodra (MINSA).

In-depth interviews were conducted with six hospital authorities and three central authorities of both the MINSA and INSS.

Table 1. Socio-demographic data

	OBSTETRICIAN/ GYNECOLOGISTS		PROFESSIONAL DECISION-MAKERS (LOCAL LEVEL)		PROFESSIONAL DECISION-MAKERS (CENTRAL LEVEL)		TOTAL	
	N	%	N	%	N	%	N	%
Gender								
Female	8	47	4	66,7	2	66,7	14	53,8
Male	9	53	2	33,3	1	33,3	12	46,2
Age								
< 35	2	11,8	0	0,0	0	0,0	2	7,7
35–50	11	64,7	2	33,3	1	33,3	14	53,8
> 50	4	23,5	4	66,7	2	66,7	10	38,5

All focus group discussions and interviews were recorded for later transcription, categorization and analysis.

Two guides were developed for the data collection: one for use with focus groups and one for use in in-depth interviews (see Annexes 1 and 2).

The research assistant for the study conducted the fieldwork. All participants were asked to sign an informed consent before participating in research activities (see Annexes 3 and 4).

The interviews were designed to collect information on the following:

- Opinions and attitudes of obstetrician/gynecologists about cesarean birth
- Factors, beyond obstetrical and/or medical indications, that affect the decision to perform a cesarean (factors for and against performing a cesarean operation)
- Consideration of obstetrical indications for cesarean birth
- Obstetrical factors that influence the decision to perform a cesarean, and the pros and cons of the decision
- Providers' perception about women's preferences with respect to the mode of childbirth
- Factors affecting the cesarean birth rate

- Existence of influential groups in Nicaragua in favor of a specific mode of childbirth
- Opinions and attitudes of obstetrician/gynecologists about cesarean birth rates in Nicaragua and globally
- Opinions and attitudes of obstetrician/gynecologists regarding interventions that could change the existing cesarean birth rate

The accuracy of transcription of the interview tapes was verified. Information from the transcripts was coded and ideas were categorized into broader themes through consensus until all of the transcripts were reviewed. The processing and coding were done using the program for qualitative data analysis Atlas TI v5.0. This was followed by analysis of the information collected using a matrix to cross data and reporting codes, correlating the different dimensions of participants' responses. Once all transcripts were analyzed, results were reviewed to describe findings that applied to the study as a whole. As hypotheses were generated, confirmation was sought by returning to the transcripts to find evidence to refute or support them.

To ensure study rigor and reduce limitations, investigator triangulation was used. The Principal Investigator coded the material, and the research assistant corroborated the coding of the material.

Findings

The results are presented based on themes derived from analysis of the coding process and categorization of the material collected during the fieldwork.

CLINICAL GUIDELINES, STANDARDS OR EXISTING TREATMENTS PROTOCOLS

Obstetrician/gynecologists offering direct services failed to be specific when asked to name clinical guidelines for cesarean birth. In addition, they did not seem very aware of standards or clinical guidelines outlining indications for cesarean operation, for either a first-time or previous cesarean. The one guideline that participants most often referred to was a regulation called "humanization of childbirth," which promotes the presence of a relative or person of the woman's choice during labor and childbirth and seeks to ensure the cultural appropriateness of care provided during labor and childbirth.

Professionals with the power to make decisions were more specific in naming guidelines, referring to treatment protocols, low-risk childbirth and indications for a cesarean birth. Indications listed by these decision-makers included acute fetal distress, breech position, teen birth, premature rupture of membranes and abnormal placental position.

> *"There are all the indications for a cesarean section [in the protocols] ... [including] in which circumstances and what criteria must be met for it to be performed—among other factors—the decision must be evaluated by a team...." (Interview with a central-level professional)*

CLINICAL FACTORS THAT DETERMINE MODE OF CHILDBIRTH

Respondents indicated that they would first opt for vaginal birth when asked about preferences for mode of childbirth for "low-risk" pregnant women. When questioned about the elements to be considered when deciding on mode of childbirth, participants cited:

- Fetal weight and presentation. These were cited as the main considerations when making a decision about mode of childbirth.
- The preference of the woman. While this is a non-clinical element, respondents felt that it greatly influences decisions about the mode of childbirth.

  "Because we did not do the cesarean section, it is requested a lot, it seems due to family pressure, so I think that influences in the final decision...." (Direct care physicians)

- History of a previous cesarean operation. When asked about indications for cesarean operation among "low-risk" pregnant women, the history of a previous cesarean operation was the most frequently cited indication. This indication was cited by both practicing physicians and decision-makers at the local and central level. Participants reported that women with history of a previous cesarean operation would only have the chance of a vaginal birth if they arrived during the second stage of labor or in advanced labor. Some of the respondents even cited that a cesarean operation should be the standard of care for women with history of previous cesarean.

In the words of one professional: "… in the next pregnancy the fact of having a previous cesarean section is an absolute indication to perform a cesarean section…." (Interview with a central-level professional)

> *"... a patient that had a cesarean section for fetal distress will have to have a repeat cesarean section only because she had a previous cesarean section, even if the birth occurs five years after the cesarean was performed, as we do not have defined protocols for vaginal birth after a previous cesarean section ...." (Interview with a central-level professional)*

Participants justified continuing to opt for cesarean operation in women with previous cesarean section by citing that their patients may also have concomitant risk factors that would influence the decision to perform a cesarean. These risk factors include spacing of less than 18 months between births, malnutrition and anemia, among others.

> *"... studies have shown that vaginal birth after cesarean section (VBAC) is a good option, but these studies have been done in developed countries where educated people space their pregnancies for a period of 10, 8 years, and is therefore reasonable ...." (Interview with a central-level professional)*

- Existence of clinical "risk" factors. When explaining the high rates of first-time cesarean births, respondents referred to the assessment of clinical "risk" factors that would influence the decision to perform a cesarean. Clinical "risk" factors included:
  - Breech and transverse presentation
  - Weight of the baby considered high/macrosomia
  - Cephalopelvic disproportion
  - Preterm pregnancy with rupture of membranes
  - Threat of preterm labor without control
  - Prolapsed cord
  - Prolonged expulsive phase
  - Pregnant women with underlying disease (cancer, exposure to pesticides, heart disease)
  - Gestational hypertensive disorders

"… a patient with acute fetal distress, a transverse lie, a mother … supposing she is "old" and multiparous, or a teenager with a difficult delivery … then you perform a cesarean section because it is indicated…." (Interview with a local-level professional)

- Maternal or fetal status or progress in labor that is not "normal." Respondents indicated that it was preferable to perform a planned cesarean operation in any situation that deviates from what is desirable, particularly given the limited human and material resources (see the section on non-clinical factors that determine mode of delivery below).

NON-CLINICAL FACTORS THAT DETERMINE MODE OF CHILDBIRTH

A myriad of non-clinical factors that determine the mode of childbirth were mentioned, and they were far more numerous than the clinical factors. The non-clinical factors are listed below in order of the weight each one is given when a provider is making a decision to perform a cesarean operation. These factors are also seen as barriers to reducing unnecessary cesarean births.

- Fear of legal actions due to malpractice.

  "… number one priority, which is the fear of medico legal problems because we didn't do a cesarean section, because there is always the probability that a patient may be upset and file a medico legal complaint." (Practicing physicians)

  "The physician acts prematurely … is contradictory because if I'm acting to save a child, they are taking him out with low birth weight, preterm, in a not ideal circumstance, why? By covering their backs, because if this child or this woman dies they can legally charge me…." (Interview with a central-level professional)

  "… If she has no obstetrical indication although the patient requests it, we try to convince her that the delivery is, so far, normal. If she has the indication, we do not doubt, at the minimum we perform the intervention…." (Direct care physicians)

- Limited human and material resources (gynecologists, equipment, surgical block). Respondents felt that without the necessary resources required to care for and monitor women during labor and childbirth, providers may not be able to detect and manage complications in a timely manner. In these situations, performing a cesarean operation was perceived as a way to prevent complications that might not be detected.

  "… We don't have the appropriate equipment; we can't properly monitor these patients all the time…." (Practicing physicians)

  Dr. 1: "… if the patient is given enough time, she may have a normal delivery but as the risk of a uterus rupture is present during labor and we need a blood bank available we perform an elective surgery …

  Dr. 2: … and of the availability of the operating room…." (Practicing physicians)

  "… For all those patients who are not in labor, we neither have the conditions nor is it a usual practice to ripen the cervix and we do not have the conditions to keep them here a week before they go into labor and be able to monitor them until they deliver; we usually make decisions very quickly because we don't have a way to keep an eye on them, they can die…." (Practicing physicians)

- Overburdened providers. Respondents indicated that a cesarean operation may be performed for convenience to the physician because of fatigue and overwork.

  "… we know that cesarean section is not indicated in low-risk pregnancy but to avoid the night pressure and the work during the night—because physicians work 24 hours a day, in Nicaragua they practically work 36 hours in a row, so the truth is that they indiscriminately start to perform cesarean section…."(Interview with a local-level professional)

- Perception of a lack of clear clinical guidelines/protocols of care to guide the recommended clinical practices.

  "... someone comes and tells me: I do not take the risk, this is natural because it is not documented in protocols...." (Interview with a central-level professional)

- Limited geographic access to obstetric services for some women. Respondents indicated that obstetrician/gynecologists will perform an elective cesarean for a woman with "risk factors" who lives in an isolated area to prevent her going into labor and giving birth where there are no specialists.

  "... sending a patient home with a term pregnancy puts her at a higher risk of having a stillborn baby, so we evaluate all the factors, including that the patient didn't undergo all the medical exams and that she lives far away, and believe it is better that she goes home with her baby in her arms than with her baby dead...." (Direct care physicians)

- Strong belief among professionals that performing a cesarean is equivalent to offering superior quality of care. Some respondents indicated that their personal preference for cesarean birth influenced the decision to perform one. In addition, some practicing obstetrician/gynecologists did not know about or did not avail themselves of statistics on cesarean birth outcomes, and did not appear to perceive problems with their current practice.

  "... Personally, I prefer cesarean section because of my experience as a patient, not as...an obstetrician...." (Interview with a local-level professional)

  "... The truth is that we do not have statistics regarding cesarean complications, which could show a fatal outcome or anything like that...." (Practicing physicians)

- Difficult relationships among the doctor, patient and the family that generate distrust and questions about the medical competence of providers. Respondents felt that this distrust increases the demand for cesareans.

  "... [If] people go to a private doctor because they distrust [public providers], and are told the woman had an indication for a cesarean section, and that it should have been already done ... then this could generate conflicts...." (Direct care physicians)

- Inadequate or limited preparation of women and their families for a vaginal birth. Respondents felt that the "guideline of accompaniment" and the "law of humanization of childbirth" may have actually exacerbated already difficult relationships among the provider and the patient and her family. They felt that some physicians who encounter relatives who are not prepared to give support to the woman in labor might try to leave the family members out of the process. Because patients and families know they are protected by law, they become more demanding and have reasons for complaint when they are left out. Respondents also felt that when the patient and family are not prepared to handle a vaginal birth or when the situation is difficult to handle, some professionals might choose to perform a cesarean as a way to take control of the situation.

- Need for surgical experience for medical residents in teaching hospitals. Based on the participants' responses, it appears that there may be "softer" criteria for performing a cesarean operation in teaching hospitals because the surgery is also done for academic purposes. In addition, some participants noted that professionals in training may be less comfortable monitoring the progress of labor, which leads to increased rates of intervention.

  "... big Women's and Child's hospitals are teaching hospitals, are training sites for residents and specialists, and that is obviously going to increase the cesarean rate...." (Interview with a central-level professional)

"... doing 25 or 30 cesarean sections per day, of course, strongly influences the reason why it is called a teaching hospital.... "(Interview with a local-level professional)

- Teaching hospitals are also referral hospitals, which have "high risk" patients. Participants felt that cesarean birth rates may be higher in referral hospitals because women are referred there from peripheral facilities and provinces where surgical interventions are not practiced and are therefore more likely to require cesarean operations.

  "... the hospital ....receives high-risk obstetric patients from other provinces, ... [and] a referred patient usually ends up having a cesarean...." (Interview with a local-level professional)

  "... The cesarean rate in this hospital is also increased because of referrals from other hospitals...." (Direct care physicians)

- Differential payment for cesarean birth. Participants felt that differential payment for cesarean birth in the private sector increases their use. It should be noted that the private sector represents only a small portion of the Nicaraguan health system.

  "... the problem of doctors is that as long as they make money, they perform a cesarean section...." (Interview with a local professional)

- Belief that the achievement of low rates of perinatal and maternal mortality is a result of the high rates of cesarean birth. Some respondents clearly felt that the relatively high cesarean birth rate is justified by the falling perinatal and mortality rates.

  "... in this company ... we have a 60 or 65% cesarean birth rate but we must not only focus on the percentage of cesarean sections, but also on the percentage of children admitted to the neonatal intensive care unit (NICU); the perinatal mortality rate here is low (0 to 3%), which justifies performing a cesarean section to avoid the delivery of an asphyxiated child, with severe distress...." (Interview with a local-level professional)

  "... we have seen a downward trend in maternal mortality ... we were at 93 per 100.000 live births, to 69 per 100.000 reported for 2010 ... the trend is definitely toward lowering [the maternal mortality rate]."(Interview with a central-level professional)

ADVANTAGES AND DISADVANTAGES OF VAGINAL BIRTH

Participants cited several benefits of vaginal birth. There was general agreement on the increased speed of recovery with vaginal versus cesarean birth. Other benefits of vaginal birth mentioned include improvement of the bond between mother and child, improved breastfeeding, shorter stays at the facility, lower cost and the quicker return to normal activities.

"... the advantages of vaginal delivery are faster recovery, it is physiological, and neither the mother nor the child is exposed to anesthesia." (Interview with a local-level professional)

Only a few disadvantages for vaginal birth were mentioned. Of these disadvantages, the lack of control of events and increased risk of complications were the most commonly cited. These perceived disadvantages taken together with the feeling that the MINSA would not protect providers in case of litigation leads to a lack of confidence to allow a trial of vaginal birth. Other less common responses included women's lack of satisfaction with vaginal birth, and fewer brachial plexus injuries and clavicular fractures with cesarean birth.

"... the MINSA being clear of what might happen, should support doctors to promote the vaginal birth ... knowing that a complication might occur...." (Direct care physicians)

ADVANTAGES AND DISADVANTAGES OF CESAREAN BIRTH

When questioned about the advantages of cesarean birth, participants mentioned the predictability of events and control of time for the physicians.

> *"... I'm coming at 8 for a c- section, at 9 I'm done, so my family is happy and all has already happened." (Direct care physicians)*

Participants unanimously cited a reduction in perinatal morbidity and mortality as an advantage of cesarean birth.

> *"... there are modern methods of anesthesia and antibiotics and everything, there is less morbidity than before, that have contributed to the boom of cesarean section...."(Direct care physicians)*

> *"... the perinatal death rate here is low (0 to 3%) which justifies performing a cesarean to avoid birth of an asphyxiated child, with severe distress, and we must not only be focused on the percentage of cesarean births but also on the percentage of perinatal deaths. (Interview with a local-level professional)*

There was general agreement that the disadvantages for a woman receiving a cesarean included the risk of being under anesthesia for the woman and the newborn and the risk of infection for the woman.

> *"... almost all patients get epidural anesthesia, which has decreased the incidence of anesthesia complications; but there is still a risk, like with any surgery; [cesarean birth] is nothing like physiological childbirth ... there is less risk of infections, dehiscence, this is the right word and tears ... there is an additional risk from cesareans for patients from rural areas who often have difficulties accessing care for a surgical intervention, which may contribute to infection in the incision...." (Interview with a local-level professional)*

PERCEPTION OF THE IMPACT OF EACH MODE OF CHILDBIRTH

Perceptions about the impact of cesarean and vaginal birth were explored. Impact is defined as the short- and long-term consequences of cesarean birth at the physical, emotional, psychological and social (individual, family and community) levels. While it could be inferred that it is not a concern because there were few references to the impact of either mode of childbirth, there were more references to the impact of cesarean than of vaginal births.

The perceived impacts of cesarean birth were primarily negative, including the increased incidence of complications and increased recovery time for women. One participant, a decision-maker at the central level, said that the increase in the number of interventions has increased the number of complications. A health-system level reference was made about increased health care costs with cesarean births.

A reduction in the incidence of neonatal asphyxia was cited as a positive impact of cesarean births.

In assessing the impact of vaginal birth, only two participants referred to advantages, mentioning the existence of lower risk of maternal infections and hospitalizations, and lower cost to the health system. Only one participant considered the speed that women who gave birth vaginally could return to their daily functions as an important element to consider.

> *"... vaginal delivery has far less risk of infection, a lower rate of hospitalization, faster return to their work... to everything it means to be a woman in these countries, the house, the husband, their children and work..." (Interview with a central-level professional)*

BARRIERS TO DECREASING THE RATE OF CESAREANS PERFORMED WITHOUT MEDICAL OR OBSTETRICAL REASONS

The barriers identified by respondents can be grouped as internal (individual/group) and external (hospital, regulatory, environmental). Of all barriers to conducting vaginal birth, participants attributed a greater role to external barriers.

Six **external barriers** to reducing unnecessary cesarean operations were identified:

- Lack of public education about the benefits of vaginal birth, and the lack of time professionals have during prenatal care to provide psychological preparation for birth. Of all the external barriers identified, there was agreement among all the categories of participating professionals that these two were the most important barriers.

  "… we need time to be able to approach the patients, and what we have in this hospital is lack of time, we are so overloaded that we usually give only 15 minutes per patient … to start to talk about this and set the psycho prophylaxis we need, above all we need time…."(Direct care physicians)

- Growing demand from patients and family to perform a cesarean. Participants felt that the demand for cesarean birth constrains the actions of the professionals, who are tempted to make decisions about the mode of childbirth that are not based on a clinical assessment of the situation. They also felt that the fear of professional malpractice suits results in the practice of defensive medicine.

  "… the number one priority, which is the fear that there will be a medical problem because we did not perform the cesarean section, always there is the possibility of an upset patient and a malpractice lawsuit." (Direct care physicians)

- Differential payment for cesarean birth in the private sector. Participants felt that the relatively higher reimbursement for cesarean birth might influence certain physicians' decision to perform a cesarean.

  "In the private sector, providers are reimbursed approximately $700 for normal childbirth and $1500 for cesarean section, so the doctor prefers to perform a cesarean…." (Interview with a local-level professional)

- The absence of audits and monitoring of both public and private practice. Participants felt that consistent audits and monitoring may moderate the use of cesareans, and their absence may facilitate performance of cesareans in the absence of clear medical or obstetrical indications.

  "… despite being the directors of health we do not have much control over the private sector, and we have problems, even in overseeing our own units, we make a great effort but we have very few staff to monitor the private units…. "(Interview with a central-level professional)

- The absence of or lack of knowledge about clinical guidelines or protocols of care. The existence of standards or clinical guidelines with precise indications for cesarean operation, for either a first-time or previous cesarean, were not well-known by obstetrician/gynecologists offering direct services. Given practicing obstetrician/gynecologists' lack of familiarity with or lack of regard for national clinical guidelines, it would be difficult to ensure their application or create a working environment in which they are systematically applied. Whether or not guidelines exist, if professionals are not aware of them, there is a perception that they would not be protected professionally or supported by the MINSA if they took actions to try to lower the cesarean rate. This finding highlights an information/knowledge gap regarding the contents of clinical guidelines for cesarean operations among obstetrician/gynecologists offering direct services.

  "… they make the rules which reach certain staff, but do not reach the operational staff, this is one of the biggest weaknesses…." (Interview with a local-level professional)

"... No, I would not risk it, and it is only natural because it is not clearly documented within the standards of care from the MINSA, and while it is not documented within the standards of care we don't have a defense...." (Interview with a central-level professional)

"... At the moment when a complication occurs in childbirth, I think the MOH is making it clear that everything should support the doctors who promote the cesarean delivery ... making it clear that a complication may occur and they would prefer not to have to be on the patient's side arguing that the doctor should have done the cesarean earlier...." (Direct care physicians)

- Inadequate human and material resources. Respondents stated that the lack of staff to perform adequate monitoring leads to the decision to perform a cesarean operation. Furthermore, the lack of available operating theaters in an emergency, blood for transfusion, epidural block, forceps or vacuum extractors also affects the decision on the mode of childbirth, tipping the balance toward performing a cesarean before there is a need for emergency services.

  "Here we do not use an epidural, which is used in other places, we do not have suction cups or forceps to facilitate the birth...." (Interview with a central-level professional)

  "... You must have ... a hospital willing to have an operating room ready, a blood bank with the units ordered, that will be ready in 10 minutes, for example no constraints, don't allow them to make excuses such as we have no forceps, we don't provide such services...." (Direct care physicians)

  "We have around 10, 11, 12 pregnant women and at night there is only one doctor on duty, we lack staff, you have to be there watching ... monitoring blood pressure, because a contraction can raise the pressure, these factors must be taken into account." (Direct care physicians)

The **internal obstacles** cited by the participants were:

- Limited contact with the scientific world. The participants' perception of indications for mode of childbirth after a previous cesarean shows that there is a lack of awareness about current clinical guidelines that recommend (scientific evidence of level A[1]) advising most women with a previous cesarean birth with low transverse incision to undergo a trial of vaginal birth, as the potential benefits outweigh the potential harm.[23]

  "... going to a conference is expensive for us, and the institution cannot support us ... nor the state. Our low wages mean we cannot pay for a conference, and the ministry doesn't even help...." (Direct care physicians)

- Ignorance of national cesarean birth rates or outcome data following a cesarean birth. Some respondents indicated that they were unaware of current statistics on cesarean birth. In principle, if providers are ignorant of national cesarean birth rates or outcome data following a cesarean birth, and have limited contact with the scientific world, they may not perceive a problem in their current practice.

  "... The truth is that we don't have statistics of cesarean complications that might negatively influence the decision to perform a cesarean, like fatal-deadly outcomes or anything like that...." (Interview with a central-level professional)

[1] "Task Force Ratings". Retrieved 2007-09-24. In clinical guidelines, recommendations for a practice are classified by the balance of risk versus benefit of the practice, and the level of evidence on which this information is based. The U.S. Preventive Services Task Force uses: Level A: Good scientific evidence suggests that the benefits of the clinical service substantially outweigh the potential risks.

FACILITATORS TO DECREASING THE RATE OF CESAREAN OPERATIONS PERFORMED WITHOUT MEDICAL OR OBSTETRICAL REASONS

The facilitators identified by respondents for reducing cesarean operations performed without clear medical or obstetrical indications can be grouped as internal (individual/group) and external (hospital, regulatory, environmental).

Five **facilitators** to reducing unnecessary cesarean operations were identified:

- Establishment of standards, protocols and/or clinical guidelines by the MINSA, especially in cases of previous cesarean operation. Results from the research clearly showed that professionals felt that clear clinical protocols would help provide the support needed for them to change their practice.

  "... We are very clear on that ... in Latin America and Central America the incidence [of cesarean births] decreased when a good protocol was established, with requirements to give a trial of vaginal birth for a woman who has had a previous cesarean." (Interview with a local-level professional)

  "When we speak of the patient with a previous cesarean it would be so that they make the rules and protocols, we don't have rules and protocols to tell this patient who has had a previous cesarean that giving birth vaginally will be an obstacle, that it has always been an obstacle ... having a guideline, a standard and a protocol to say I will do this because this is regulated and this protects me and this is the law...." (Interview with a local-level professional)

Given that the respondents identified establishment of clear clinical protocols as a facilitator to reducing cesarean births, it is encouraging to note that this issue could be addressed in Nicaragua as the MINSA is currently reviewing and drafting the clinical protocols and standards of care for high-risk obstetrics.

"... I think that right now they are revising the standards for high-risk obstetrics, I think the issue of cesarean section is being considered, the protocol for mode of delivery in women with a prior cesarean and if you should induce labor...." (Interview with a local-level professional)

- Prenatal classes to prepare pregnant women and their families for birth. Respondents felt that adequate preparation would positively influence the course during labor and reduce women's demand for a cesarean birth.

  "Another element considered very useful is the inclusion of prenatal classes that help prepare pregnant women and their families for birth, since the lack of education is one of the elements that contributes to the choice of mode of delivery. ... We still have many gaps regarding guidelines towards humanized delivery care, and this is when you receive pressure from the relatives. Since the patient is not prepared, and the family does not accompany the woman during prenatal care, what we used to call psycho prophylactic preparation for delivery, which was to prepare the woman for the whole period of labor, then she does it alone. The relatives do not accompany the women...." (Direct care physicians)

  "... It is a facilitating factor that the companions are already immersed in the process of prenatal care and, therefore, care in labor ... they have knowledge on what prenatal care is and what care in labor is...."(Interview with a central-level professional)

- Incorporation of monitoring systems, audits and planning. Respondents felt that the establishment of indicators and means to monitor them would positively influence the cesarean birth rate.

  "... There is no good planning from the management standpoint, such as power control, and for the hospital directors to make an effective reduction, where they have to strictly monitor this indicator...." (Interview with a central-level professional)

"It helped a lot because they have been very attached to the idea that if these rules have been agreed on by everyone they must be respected by everyone, and HCI has been monitoring the compliance with indicators that led to the revision of standards…." (Interview with a central-level professional)

- Recent introduction of rules to de-medicalize care in labor. Participants felt that the implementation of interventions to de-medicalize care in labor has resulted in health care providers adhering increasingly to recommended changes in provider behavior. This shows that there exists a certain openness to accepting recommended changes in practice.

  "For us to change … at first it was hard but … we have begun to accept, we try … when the patient decides to have a companion in labor, you give her one, if she does not want one, I respect her wish and try to accompany her myself or ask a colleague to." (Direct care physicians)

- Implementation of community-based interventions to track pregnant women and provide information about vaginal birth. Respondents felt that nurses and social workers could play key roles in supporting interventions at a community level, considering the close contact they have with the patients and families, and that this contact would support women in accepting vaginal birth and reduce demands for cesarean birth.

  "… There is a little more work to be done in primary care, with nursing assistants, with social workers with the team dealing with community care, so that they don't only use the visit to track why the pregnant woman did not arrive to her visit, or if she already delivered, but also to create a little awareness of what a vaginal delivery is…." (Interview with a central-level professional)

Opinions on an Intervention to Decrease the Cesarean Rate

Professionals with decision-making skills were asked to provide their opinion on whether a strategy that combined training of facilitators/opinion leaders selected by their peers, training in clinical skills and use of feedback on cesarean births would be effective in changing the behavior of health care professionals with regard to the performance of cesareans. Although inclusion of this strategy was recommended in ongoing training systems, participants expressed concerns about the lack of time for implementing new measures. One participant suggested including a communication module targeting the population, using mass media, to provide information on the benefits of vaginal birth.

When participants were asked to identify advocates for vaginal birth and potential allies for implementing an intervention to decrease the cesarean birth rate, there was no clearly identified institution. However, it was noted that the midwives, nongovernmental organizations and donors who supported the Swiss project "humanization of childbirth," could be potential partners in the planning of an intervention for this purpose, given their interest in de-medicalizing childbirth.

COMPARISON OF FACTORS DETERMINING THE MODE OF CHILDBIRTH FOR INSS AND MINSA PROFESSIONALS

It is important to highlight that not enough data were collected to allow identifying and establishing differences between INSS and MINSA institutions on the reasons for performing a cesarean operation. However, some participants from the MINSA institutions also hold positions on INSS institutions, so their answers may refer to both types of institutions (INSS and MINSA).

Very little information was collected from professionals working in INSS institutions due to the difficulty in establishing contact with them. One interview was conducted with a professional in a bureaucratic position. The INSS professional stated that cesarean operations are usually performed for purely obstetrical factors, and less often performed to avoid medico-legal problems. Based on this interview, an assumption was made that cesarean operations were not performed by choice or because of a demand made by the patients. However, the quality of the

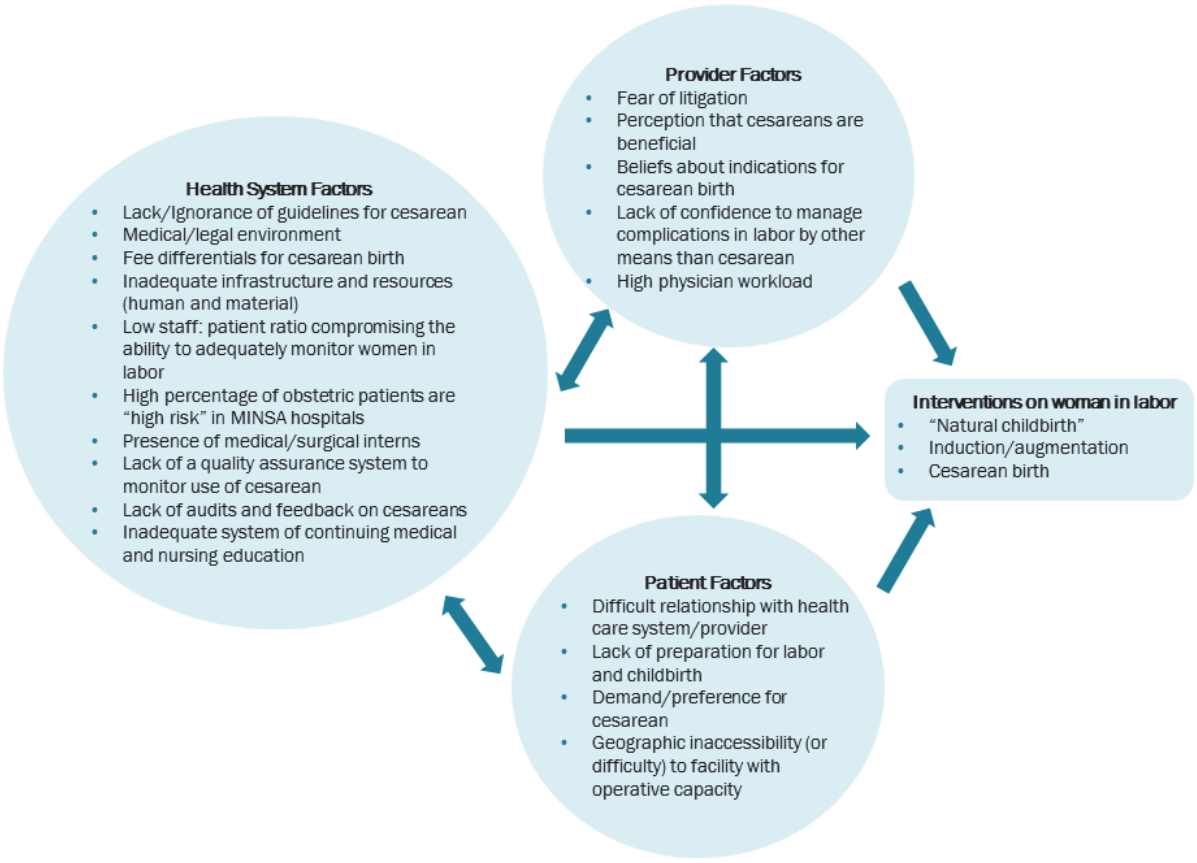
information obtained is less rich than would be desired, as the investigators believed that the official gave information on what "should be said."

Focus groups were conducted with professionals from the MINSA institutions, and they seemed able to provide more honest responses than those provided by the INSS professional. Participants from MINSA institutions referred to the limited resources available to adequately monitor patients during labor, leading to the decision to perform more cesareans. They also felt that, in general, the MINSA population of patients is at a higher risk than the INSS population. These professionals made explicit the need for tort reforms that would address their concerns about litigation and could potentially increase their flexibility when making a decision to perform a cesarean operation. It is interesting to note that, in response to the question: "*Do you believe that there are differences in the rate of cesarean births between MOH and INSS institutions?"* One participant from a MINSA institution responded: *"The insured makes much more pressure than public patients to receive a cesarean section… I think this puts 'pressure' on the physician to make a decision to perform a cesarean."*

Summary

Participants in the formative research identified health systems, provider and patient factors that all influence the high rates of cesarean births in Nicaragua (see Figure 1).

Figure 1. Factors influencing the mode of delivery



In analyzing the determinants for the performance of a cesarean, while previous cesarean was the single most important clinical indication given for performing a cesarean, non-clinical reasons also greatly influence the decision on whether to support vaginal birth or perform a cesarean. This is consistent with studies conducted in countries that report high utilization rates of cesarean operations (Althabe et al. 2004). [17] Also, while both clinical and non-clinical factors for performing a cesarean were cited by practicing physicians, it was clear that physicians were mostly motivated by a desire to improve outcomes for the woman and her baby.

Providers interviewed in Nicaragua felt that the following interventions could help reduce unnecessary cesareans: Establishment of standards, protocols and/or clinical guidelines by the MINSA, especially in cases of previous cesarean operation; prenatal classes to prepare pregnant women and their families for birth; incorporation of provider updates, monitoring systems, audits and planning; establishment of indicators and means to monitor them; implementation of community-based interventions to track pregnant women and provide information about vaginal birth; and the initiative to "humanize birth."

Study Limitations

The nature of the focus group increases the possibility that the respondents may have been influenced or inhibited by other participants in the group. To limit this bias, the number of participants in each focus group session was limited, and only obstetrician/gynecologists considered peers were included in the group.

A second limitation with this type of research is that it is very difficult to prevent or detect researcher- induced bias. However, validity standards were achieved. Data were jointly coded and classified by categories by two researchers to limit potential bias and inappropriate interpretation of transcripts. In addition, the results were validated by representatives of the community of subjects who participated in the research.

A third limitation of the study is the small sample size. Although the sample size is small, the study team feels that the participants were a representative sample of obstetrician/gynecologists and decision-makers. Moreover, the quality of the data is adequate for the purpose of developing a plan for Nicaragua to reduce cesarean births.

Although participants cited inadequate human resources, equipment, infrastructure and supplies as important factors influencing high cesarean birth rates, no assessment of existing resources or analysis of their adequacy was performed to validate this finding.

Finally, participants stated that the woman's demand for a cesarean is an important factor in the decision to perform one. However, no qualitative data were collected from women to verify the validity of this finding.

Conclusions

There appears to be an information gap on the part of providers on indications for cesarean birth, most particularly for women with a history of a previous cesarean birth. From the obstetrician/ gynecologists' responses, this information gap appears to be due to lack or ignorance of existing clinical guidelines, lack of support from the MINSA for attendance at continuing medical education conferences and lack of a well-established system for continuing education. Because the

professionals who were interviewed indicated that clinical guidelines for cesarean birth do exist, the problem could be that the guidelines are either not well-disseminated or obstetrician/gynecologists simply do not feel adequately supported to apply them. Whether or not guidelines do exist, there is a clear need for regular clinical updates for obstetrician/gynecologists as well as an effective system to disseminate guidelines and ensure that they are systematically and consistently applied.

The fear of litigation and the liability environment clearly influences mode of childbirth in Nicaragua. While data collected for this study do not permit an analysis of the magnitude of the effects on the cesarean birth rate, reduced litigation pressure and/or clear support of obstetrician/gynecologists by the MINSA for implementing initiatives to reduce cesarean births would likely lead to decreases in the total number of cesarean births or at least less pressure on the obstetrician/gynecologists to perform a cesarean when there are no clear medical or obstetrical indications. In addition, providers need to be educated that use of defensive medicine has been proven completely ineffective as a legal preventive strategy for patient care. In fact, it has been shown to do nothing to facilitate making appropriate clinical decisions and adds new professional hazards, acting instead as an impetus for unnecessary medical acts. [24]

Participants felt that the fee differentials between cesarean and normal childbirth in the private sector lead to higher cesarean birth rates. Although this finding was not corroborated, lower fee differentials between cesarean and normal childbirth could potentially result in real reductions in the cesarean birth rate.

The participants felt that a woman's demand greatly influenced their decision to perform a cesarean, and that this demand came from information gaps on indications, risks and benefits of cesarean birth and lack of preparation for childbirth. They also felt that difficult client-provider relationships and distrust of obstetrician/gynecologists influenced the woman's desire for a cesarean. It is interesting to note that practicing obstetrician/gynecologists felt that the initiative to "humanize birth" was both a factor exacerbating already difficult client-provider relationships and a possible solution for reducing women's demands for a cesarean. Because the perception of patient-requested cesarean was not corroborated, it is difficult to provide clear recommendations for implementing an intervention targeted at women and their families. However, it is clear that, at the least, improving client-provider interactions would have a beneficial effect on women's demands for a cesarean when no clear indications exist.

There is the perception that performing a cesarean is a way to reduce the workload of overworked, tired obstetrician/gynecologists as well as a means to mitigate limited resources. This perception clearly needs to be corroborated and feedback provided to the obstetrician/gynecologists on the effectiveness of these strategies to actually improve care and address inadequate human and material resources.

Findings support the assumption that obstetrician/gynecologists seek to implement best practices and act with the intent to assure maternal and perinatal safety. This is made clear by the fact that obstetrician/gynecologists clearly believed that performing elective cesareans for all women with previous cesarean birth was for the woman's and baby's benefit and that the high rate of cesarean birth was beneficial overall for maternal and newborn health. This is also supported by the obstetrician/gynecologists' statements that they would opt to perform a cesarean if they felt the woman could not be adequately monitored during labor or if she would not have timely access to operative birth if this was needed.

It appears that obstetrician/gynecologists have limited tools to adequately evaluate the effectiveness of how and when they perform cesarean operations. Participants clearly felt that the high cesarean rates had an influence on decreasing maternal and perinatal mortality rates, and did not seem aware of either national statistics for cesarean birth or outcomes of cesarean births. In addition,

participants felt that the lack of monitoring and use of audits contributed to their ignorance of the consequences of high cesarean birth rates. Participants felt that incorporation of monitoring systems, audits and planning would have a positive impact on decreasing the cesarean birth rate.

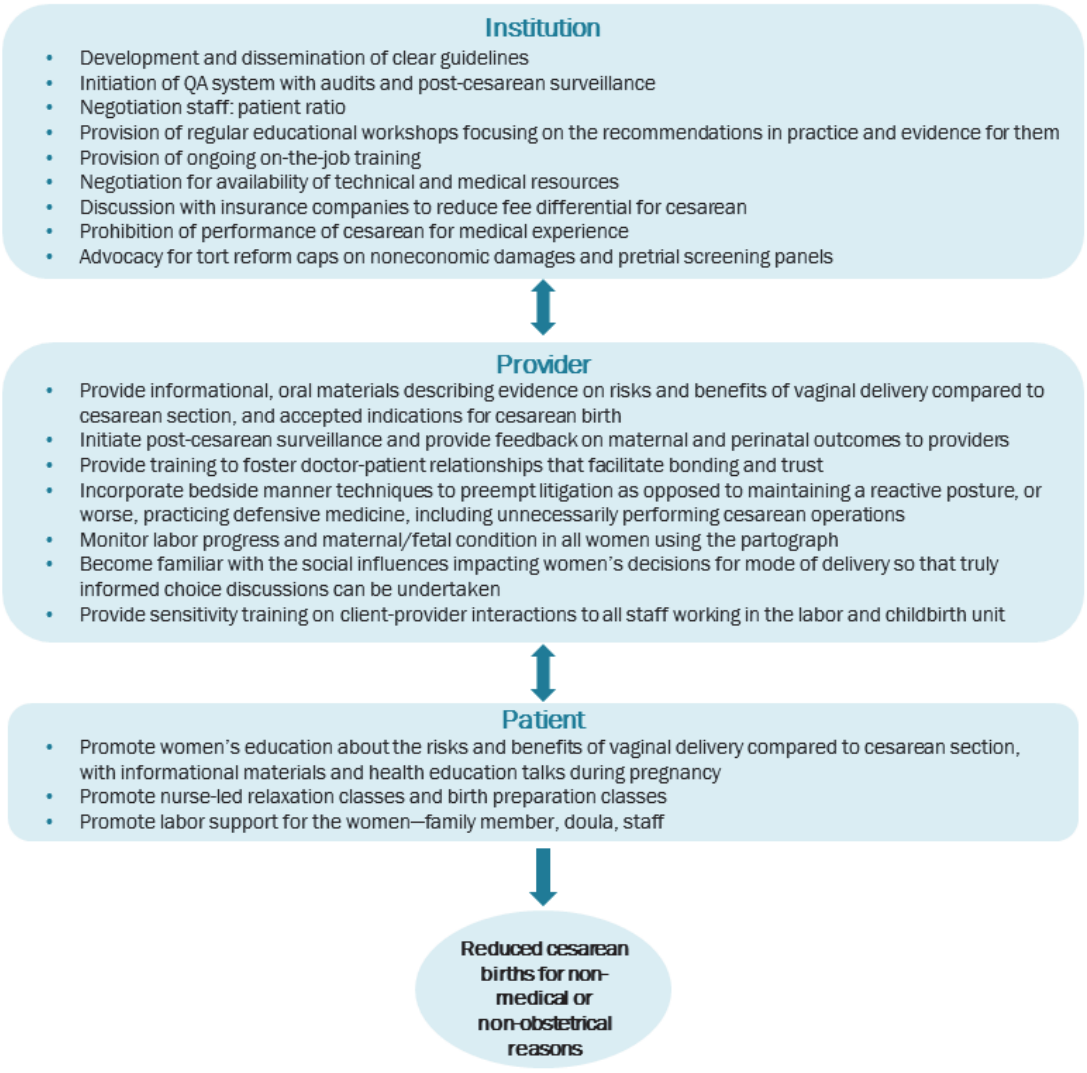
Finally, practicing obstetrician/gynecologists made it clear that they require an enabling work environment, evidence, tools and support to assess their practices and implement recommended guidelines.

Based on findings from physicians interviewed, it is clear that the high cesarean birth rate in Nicaragua is due to many clinical and non-clinical factors. Any strategy to reduce the cesarean birth rate will therefore have to address health system, provider and patient factors.

Recommendations

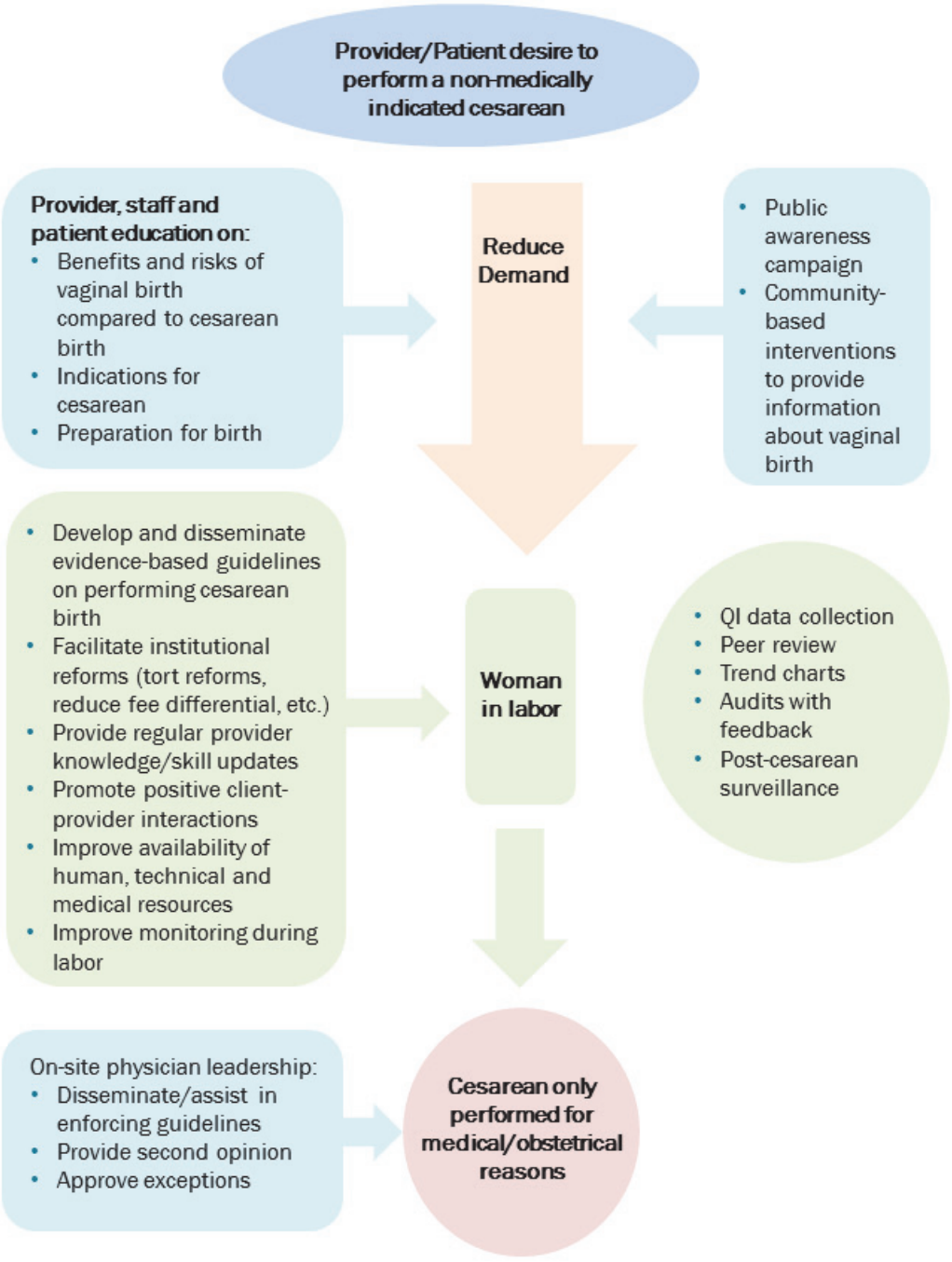
Multiple evidence-based strategies exist for reducing rates of unnecessary cesarean operations, and different countries have attempted different interventions to reduce the cesarean rate for non-medical or non-obstetrical reasons with varying success (see Figure 2 and Annex 5).

Figure 2. Possible interventions to reduce cesarean births for non-medical reasons



Given that individual interventions have not by themselves resulted in reduced cesarean births and the fact that identified causes of unnecessary cesarean birth in Nicaragua are multifactorial, the study team believes that the cesarean birth rate can be safely reduced by implementing a multifaceted strategy that addresses health system, provider, and patient factors (see Figure 3).

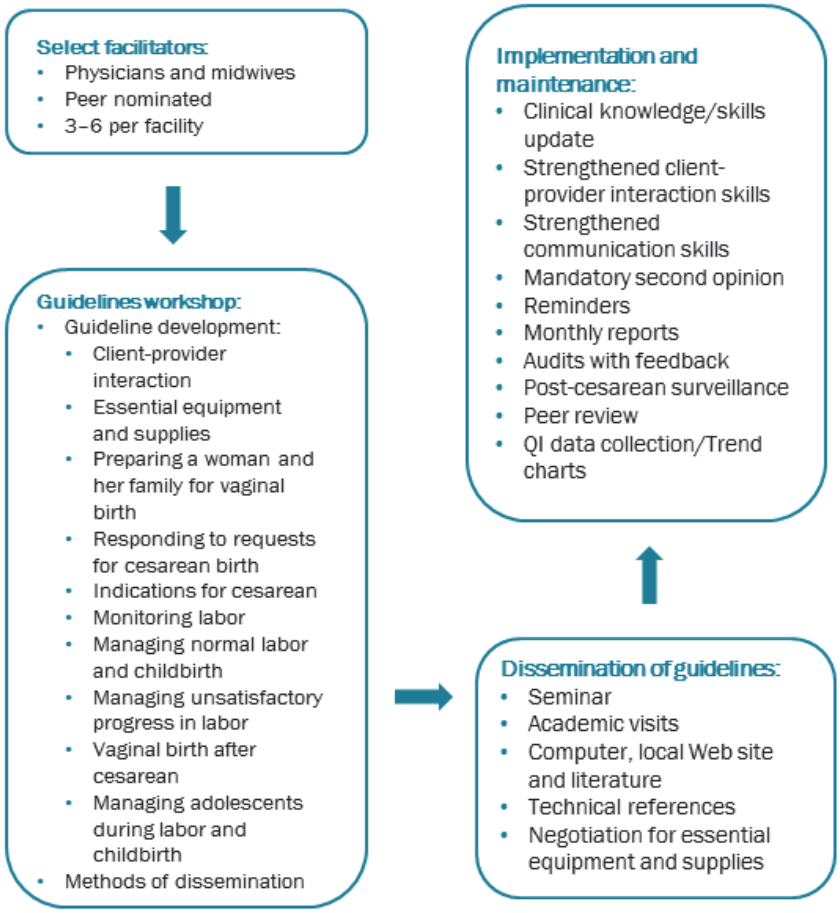
Figure 3. Multifaceted intervention to address reasons for cesareans performed for non-medical or non-obstetrical reasons



The MINSA received the results of the formative research with great interest. As a first step, the MINSA is using findings from this formative research to update existing guidelines and clinical protocols for managing women in labor and providing clear indications for performing a cesarean operation. Although it is not clear from the interviews and focus group discussions whether these guidelines and protocols exist but are not accessible/disseminated, exist but are outdated, or do not exist, the availability of evidence-based clinical guidelines and protocols for managing labor and childbirth, including indications for cesarean operation, should assist with lowering the rates of cesarean birth by addressing some of the provider factors.

Once guidelines are updated, they will need to be disseminated to and implemented by providers. Effective implementation of evidence-based health care practices remains a significant challenge. Several systematic reviews on that subject concluded that there are no "magic bullets" to change professional behavior. The best approach is to evaluate what the main barriers are for the adoption of the desired practice, involve health professionals in the analysis and modification of their practice,[16] use audits and feedback, and select strategies (single or combined) that are appropriate for each community and institution and have already been proven effective in overcoming the identified barriers. [27-28] One way to address provider factors affecting the high cesarean rate in Nicaragua is to implement a strategy similar to the intervention to **c**hange providers' application of **a**ctive **m**anagement of the third stage of labor **i**n **o**bstetrics (CAMBIO) (see Figure 4), which has been successful in reducing unnecessary episiotomies in facilities in Nicaragua. This complex intervention involves health care providers in analyzing and modifying their practice and improves adherence to guidelines.

Figure 4. Scheme of proposed interventions to improve provider adherence to guidelines



In addition to updating and disseminating clinical guidelines, protocols and standards, it will be important to address the health system and patient factors influencing the high rate of cesarean births.

One intervention to address patient factors would be to strengthen the existing initiative to "humanize childbirth." This initiative in Nicaragua promotes women's support for a person of their choice to accompany them during labor and childbirth. However, the initiative has not been widely implemented, as currently 61% of women give birth without a companion.[2]

The MINSA can use evidence from other country experiences (see Annex 5) to design additional interventions that address non-clinical factors affecting the cesarean birth rate that are appropriate for the Nicaraguan context. It will be important to have a good theoretical understanding of how the intervention causes change, so that weak links in the causal chain can be identified and strengthened.

Future Research

It would be of utmost importance to complement the results presented here with an investigation involving women users of services: to obtain their views, beliefs and perspectives on modes of childbirth. The view of users is essential for the refinement of an intervention designed to lower the cesarean birth rate.

[2] Baseline data from the CAMBIO intervention to increase uptake of active management of the third stage of labor and reduce unnecessary episiotomies.

Annex 1. Guide for Focus Groups with Health Care Providers Who Attend to Births

Thank you for participating in this study. We are members of the Institute for Clinical Effectiveness and Health Policy (IECS), Argentina; and the Montevideo Clinical and Epidemiological Research Unit (UNICEM) of Uruguay and are interested in hearing about your preferences on the form of giving birth in low-risk pregnancies. We would like to know the factors that usually contribute to your decisions. The objective of this research is to understand the preferences and attitudes of health professionals involved in the cesarean births in Nicaragua, and to develop an intervention that reduces the use of cesarean birth when it is not strictly necessary.

We hope to have an open dialogue where we can share ideas and opinions freely. Therefore, we inform you that all the concepts discussed and expressed in this group remain confidential. Furthermore, we hope that you have differing points of view, each representing different roles and each with your own unique experiences.

To begin with, we will discuss some basic points.

INTRODUCTORY QUESTIONS

1. Can you give me an idea what is at stake in a birth by cesarean section (CS)?(How is it resolved, what is considered)
2. Can you give me an idea about what is at stake in a vaginal birth (PV)? (How is it resolved, what is considered)

ADVANTAGES AND DISADVANTAGES

What do you think are the advantages of a vaginal birth or vaginal birth (PV)? Explore: a. What are the benefits for women in having a PV? b. What are the benefits for practitioners in PV? c. What are the benefits for the health system?
What do you think are the disadvantages of a PV? Explore: a. What would the dangers be for women in having a PV? b. What would the dangers be for the professionals in a PV? c. What would the dangers be for the health system?
What would the dangers be for the health system? Explore: a. What are the benefits for women having a CS? b. What are the benefits for practitioners in a CS? c. What are the benefits for the health system?
What do you think the disadvantages are of a birth by cesarean section (CS)? Explore: a. What would the dangers be for the women having a CS? b. What would the dangers be for the professionals to make a CS? c. What would be the dangers for the health system?

MAIN RESULTS

1.	What are the main results on the physical level of a PV? What impact do you think it has on the body of a woman?
2.	What do you think is the social impact of a PV? How does a PV affect women and others in the life of the woman?
3.	What is the long-term impact of a PV?
4.	What is the short-term impact of a PV?
5.	What are the main physical results of a CS? What impact do you think it has on the body of a woman?
6.	What is the social impact of a CS? How does a CS affect women and others in the life of the woman?
7.	What is the long-term impact of a CS?
8.	What is the short-term impact of a CS?
9.	Are you aware of the CS rates in Nicaragua and the rest of the world?
10.	What is your view on these numbers?

BARRIERS AND FACILITATORS

1.	What conditions must there be to have a PV?
2.	What situation could lead to the decision to do a CS even when the conditions are appropriate to consider a PV? EXPLORE TIME, WILL OF WOMEN, ETC.
3.	What are indications for a CS, in your opinion?
4.	What situation could lead to the decision to have a PV even when the conditions are appropriate to do a CS?

REFERENCES

1.	Please list the individuals or groups who promote PV
2.	What reasons are there to promote PV?
3.	Please list the individuals or groups who promote elective CS
4.	What reasons are there to promote elective CS?
5.	Please list the individuals or groups who are actively trying to reduce CS rates
6.	What reasons are there to try to reduce the rates of CS?
7.	What are your opinions or perceptions about women's preferences regarding the way of completion of delivery? a. Why do you think this? b. Do you think this might affect your decision?

POSSIBLE INTERVENTIONS EFFECTIVE IN REDUCING CESAREAN RATES IN YOUR INTITUTIONS

I will now mention some strategies that have been suggested as appropriate in changing behavior of health professionals during care in delivery. I would like to hear your comments on what you think would be most helpful in reducing CS rates.

a) Selecting a professional or a small group of professionals (facilitators) to be in charge of promoting changes in the hospital and those who receive information and training for these changes in the hospital. *or do you think they could work together to promote change? Why?* *From your point of view, who do you believe these professionals should be? (Mention characteristics related to their position in the hospital), why?* *What characteristics should they have?* *or who should choose?*	• Do you think they could work together to promote change? Why? • From your point of view, who do you believe these professionals should be? (Mention characteristics related to their position in the hospital), why? • What characteristics should they have? • Who should choose?
b) A workshop for "facilitating", with the aim of training them in the development of recommendations for the implementation of clinical guidelines	• Would that be useful or not? Why? • What should the course involve? • How long should it take? • What would the best time be to achieve "good attendance"?
c) Presentation to the entire hospital and academic visits (individual visits to discuss the guidelines)	• Do you think it would be useful? • How feasible would it be? • What would the facilitators need to deal with the responsibility?
d) Specific reminders	• Do you think it would be useful? • What do you believe the content should be? • Where could they be? e.g., in the HC, in nursing, in the administration?
What do you think about the overall strategy? Would you like to suggest another way to promote behavioral change among health personnel in the care during delivery?	

Closing

Facilitator: Make a brief summary of the topics discussed during the meeting.

We have discussed the factors involved in choosing the mode of delivery in women at low risk.

We are grateful for the information and your time. Before closing this dialogue, is there anything else you want to discuss or would like to add that you have not had the opportunity to mention earlier on?

Many thanks indeed.

Annex 2. Guide for In-Depth Interviews with the Hospital Authorities

Thank you for participating in this study. We are members of the Institute for Clinical Effectiveness and Health Policy (IECS), Argentina; and the Montevideo Clinical and Epidemiological Research Unit (UNICEM) of Uruguay. We are interested in hearing about your preferences on the modes of birth in low-risk pregnancies. We would like to know the factors that usually contribute to your decisions. The objective of this research is to learn the preferences and attitudes of health professionals involved in cesarean births in Nicaragua, and to develop an intervention that reduces the use of cesarean births when it is not strictly necessary.

We hope to have an open dialogue, where you can express your ideas and opinions freely. Therefore, we inform you that all the concepts discussed in this interview remain confidential.

To begin with we will discuss some basic points.

INTRODUCTORY QUESTIONS

1. Do you know/or have you heard about any rules/national clinical practice guidelines on the use of cesarean section (CS)?
2. Do you know/or have you heard about any rules/national clinical practice guidelines on the use of vaginal birth (PV)?
3. Can you give me an idea about what is at stake in a CS birth in this place? (How is it resolved, what is considered)
4. Can you give me an idea about what is at stake in a PV in this place? (How it is resolved, what is considered)

ADVANTANGES AND DISADVANTAGES

What do you think are the advantages of a vaginal birth (PV)? Explore: a. What are the benefits for women in having a PV? b. What are the benefits for practitioners in a PV? c. What are the benefits for the health system?
What do you think the disadvantages of a PV are? Explore: a. What would the dangers be for women to have a PV? b. What would the dangers be for the professionals in a PV? c. What are the benefits for the health system?
What do you think are the advantages of a birth by cesarean section (CS)? Explore a. What are the benefits for women having a CS? b. What are the benefits for practitioners in a CS? c. What are the benefits for the health system in a CS?
What do you think are the disadvantages of a birth by cesarean section? Explore: a. What would the dangers be for women having a CS? b. What would the dangers be for the professionals in having a CS? c. What would the dangers be for the health system?

MAIN RESULTS

1.	Are you aware of the CS rates in Nicaragua? a. Are you aware of the CS rates in the world? b. What do you think the reasons are for these differences?
2.	What do you think should be the expected CS rates in Nicaragua?
3.	What are the economic consequences of a PV?
4.	What are the social consequences of a PV? That is to say, how would having a PV affect the woman or other people in your life?
5.	What are the economic consequences of a CS?
6.	What are the social consequences of a CS? That is to say, how would having a CS affect the woman or other people in your life?

BARRIERS AND FACILITATORS

1.	What conditions should be present to increase the rates of PV at a national level?
2.	What could interfere with the attempt to increase national rates of PV?
3.	What conditions should be present to reduce CS rates at a national level?
4.	What could interfere with the attempt to bring down the national rates of CS?

REFERENCES

1.	Please list individuals or groups that support or promote the election of a PV
2.	What reasons are there to promote PV?
3.	Please list individuals or groups that support or promote CS
4.	What reasons to do they give to promote elective CS?
5.	Please mention individuals or groups who are actively trying to reduce the rates of CS
6.	What reasons are there to lower the CS rates?

Closing

Facilitator: Make a brief summary of the topics discussed during the meeting.

We have discussed the factors involved in choosing the mode of delivery in women at low risk.

We are grateful for the information and your time. Before closing this dialogue, is there anything else you would like to add that you have not had the opportunity to mention earlier on? Many thanks indeed.

Annex 3. Informed Consent for Focus Groups with Health Care Providers

This informed consent should apply to health professionals who provide obstetric care directly in the selected institutions. We would like to invite you to participate in this study with the objective of collecting information on the views of health care providers on the mode of delivery in low-risk pregnancies.

The research title is "Formative research to assess the views of health care providers in Nicaragua on the mode of delivery in low-risk pregnancies."

Name of Principal Investigator: Ms. Mercedes Colomar, Research in Social Sciences, UNICEM—Uruguay

Name of Organizations: Ministry of Health of Nicaragua, Managua, Nicaragua; Maternal and Child Health Integrated Program, funded by the U.S. Agency for International Development (USAID); Institute of Clinical Effectiveness and Health Policy, Buenos Aires, Argentina; Montevideo Clinical and Epidemiological Research Unit, Montevideo, Uruguay; Program for Appropriate Technology in Health (PATH), an international public health organization Managua, Nicaragua, and Seattle, Washington, USA.

Sponsor: Maternal and Child Health Integrated Program

Introduction
My name is.... I work for the Montevideo Clinical and Epidemiological Research Unit (UNICEM).We are carrying out research into the views of health professionals attending deliveries on the mode of delivery in low-risk pregnancies. We are inviting professionals to participate who attend births in selected institutions.

I will give you information and invite you to take part in this research. Before making a decision, you can discuss the investigation with any person with whom you feel comfortable. You can also contact Dr. Ezequiel Garcia Elorrio, who is in charge of this investigation, telephone +5411 8767 4777.

Please interrupt me if you do not understand something as I am giving the information. I will be more than happy to explain. If you have any questions later on, you can ask the researcher, the research team or me.

If you decide to participate in the study, you will receive a copy of this informed consent.

Why is this study being done?
The purpose of this research is to learn about the opinions of decision-makers and managers in the mode of delivery in low-risk pregnancies. We will use this information to develop an intervention to improve the quality of care in delivery and reduce the incidence of cesareans performed without clear medical indication in Nicaragua.

This intervention consists of activities to be conducted with health care providers from hospitals in Nicaragua.

What are the procedures of the study? What will I be asked to do?
We will obtain information on the views of health professionals on how to complete delivery in low-risk pregnancies by conducting focus groups and in-depth interviews with decision-makers, managers and professionals who deliver babies. If you agree to participate in this study, we will invite you to complete a brief form and participate in an interview.

The aim of these groups is to give you the opportunity to share your experiences and views on what factors may have contributed to your decision on the termination mode of delivery.

Your honest feedback will help us develop materials that are practical and effective. Before the session, we will ask you to fill out a short questionnaire. The questionnaire contains questions about yourself such as age, sex, education and years of work in your current hospital. This information will be used to help understand the results of focus groups. It will take two minutes to complete the questionnaire.

During the focus group study, you will describe the factors that motivate the choice of mode of delivery, the potential advantages and disadvantages of each way, and possible barriers and facilitators for using each of the type of delivery. The working group will have a maximum of two hours.

What are the risks or drawbacks of the studies?
Formative research on cesarean does not involve significant risks to professionals involved in the study.

The potential risk associated with participation in this study is that the opinions you share during the discussion may be unveiled by other group members.

A possible drawback may be the time it takes to complete the questionnaire or for you to participate in the group.

What are the benefits of the study?
While you will not benefit directly from this research, you can benefit from the satisfaction of contributing to a research project whose findings may help pregnant women in the future.

Will I receive any payment for my participation?
You will not receive payment to participate in this study. Participation in this research is voluntary.

Are there any costs involved?
There is no cost to you for participation in this study.

How will my personal information be protected?
In this study, we are only interested in the opinions of health care providers in these groups, not their identities. You do not have to reveal your real name to the group. The working group will be recorded on audio, so that a transcript of the conversation of the group can be prepared for analysis. This means that the names of the participants and the information shared in the group will remain confidential.

Also be aware that the PATH and MINSA Ethics Committee in Nicaragua could inspect the records of the study as part of its audit, but these assessments focus only on the researchers and not on the health care providers' responses or participation. The Ethics Committee is a group of people who review research to protect the rights and welfare of participants in it.

Can I withdraw my participation in the study? What are my rights?
Your participation is voluntary; you are not required to participate in this study if you do not want to. If you agree, but later change your mind, you can leave the group at any time. There is no penalty or consequence of any kind if you decide not to participate. If you participate, but then want to leave before the end of the group, you are free to do so. You may refuse to answer any questions raised during the discussion. What you decide will not affect your work in any way.

Declaration of potential conflicts of interest
Researchers in this study are interested in the knowledge gained from research. Researchers may get a salary or other financial support for conducting research.

Whom do I contact if I have questions about the study?
Take as long as you want before making the decision to participate in this study. We are happy to answer any questions you have about this study. If you have questions about this study or if you have a problem with the investigation, please contact the Principal Investigator, Dr. Ezequiel Garcia Elorrio, phone +541147778767 or Ms. Mercedes Colomar, phone +5982 4864175.

If you have questions about your rights as a research participant, please contact the Ministry of Health of Nicaragua.

Conclusion
Do you have any questions? Yes: _____ No: _____

Do you agree to be interviewed? Yes: _____ No: _____

Certificate of Consent
Formative research to determine the views of health professionals on how to finish delivery in low-risk pregnancies.

I have read this form and decided that I will participate in the research project described above. Its general objectives, the participation data and the possible risks and inconveniences have been explained to my satisfaction. I understand that I can withdraw at any time. My signature indicates that I have received a copy of this consent form.

Signature of Participant	**Date**

Person Obtaining Consent	**Date**

Annex 4. Informed Consent for In-Depth Interviews with Hospital Officials and Administrators

This informed consent should apply to hospital officials, decision-makers and administrators who set policies and procedures in the management of labor. We would like to invite you to participate in this study, which aims to collect information on the views of health professionals who make decisions about the type of delivery in low-risk pregnancies.

The research title is "Formative research to assess the views of health care providers in Nicaragua on the mode of delivery in low-risk pregnancies."

Name of Principal Investigator: Ms. Mercedes Colomar, Research in social sciences, UNICEM, Uruguay

Name of Organization: Ministry of Health of Nicaragua, Managua, Nicaragua; Maternal and Child Health Integrated Program, funded by USAID; Institute of Clinical Effectiveness and Health Policy, Buenos Aires, Argentina; Montevideo Clinical and Epidemiological Research Unit, Montevideo, Uruguay; Program for Appropriate Technology in Health (PATH), an international public health organization, Managua, Nicaragua, and Seattle, Washington, USA.

Sponsor: Maternal and Child Health Integrated Program

Introduction
My name is.... I work for the Montevideo Clinical and Epidemiological Research Unit (UNICEM).We are carrying out research into the views of health professionals attending deliveries on the mode of delivery in low-risk pregnancies. We are inviting some managers or directors in the perinatal area selected to participate in research.

I will give you information and invite you to take part in this research. Before making a decision, you can discuss the investigation with any person with whom you feel comfortable. You can also contact Dr. Ezequiel Garcia Elorrio, who is in charge of this investigation, telephone +5411 8767 4777.

Please interrupt me if you do not understand something as I am providing the information. I will be more than happy to explain. If you have any questions later on, you can ask the researcher, the research team or me.

If you decide to participate in the study, you will receive a copy of this informed consent.

Why is this study being done?
The purpose of this research is to learn about the opinions of decision makers and managers in the mode of delivery in low-risk pregnancies. This information will be used to develop an intervention to improve the quality of care in delivery and reduce the incidence of cesareans performed without clear medical indication in Nicaragua.

What are the procedures of the study? What will I be asked?
We will obtain information on the views of health professionals on how to finish delivery in low-risk pregnancies by conducting focus groups and in-depth interviews with decision-makers,

managers and professionals who deliver babies. If you agree to participate in this study, we will invite you to complete a brief form and participate in an interview.

The purpose of this interview is to give you the opportunity to share your experiences and views on the factors that contribute to the development of strategies and policies related to completion of delivery mode.

Your honest feedback will help us develop materials that are practical and effective. Before the interview we will ask you to fill out a short questionnaire. The questionnaire contains questions about yourself, such as age, sex, education and years of work in your current hospital. This information will be used to help us understand the results of the interview. Filling it out will take about three minutes.

During the interview, you will be asked to describe the factors that determine the decisions and regulations on the mode of delivery. We will also discuss what the advantages and disadvantages are of each form of completion of delivery, and possible barriers and facilitators to implementing each type of delivery. The interview will last a maximum of one hour.

What are the risks or drawbacks of the study?
There is a potential risk that you may be identified by others not involved in the study.
A possible drawback may be the time it takes to complete the questionnaire and for you to participate in the interview.

What are the benefits of the study?
You will not benefit directly from this research. But you can benefit from the satisfaction of contributing to a research project whose findings may help pregnant women in the future.

Will I receive payment for participation?
You will not be paid to participate in this study.

Are there any costs involved?
There is no cost to you for participating in this study.

How will my personal information be protected?
In this study, we are only interested in your opinion as an administrator or decision-maker, not your identity.

Do not include your name on the questionnaire to prevent you from being identified by others not involved in the study.

We will not share what you said during the discussion with your colleagues or superiors. Your name will not appear in any publication.

Also be aware that the PATH and the MOH Ethics Committee in Nicaragua could inspect the records of the study as part of its audit, but these assessments focus only on the researchers and not on the administrator's or decision-makers' responses or participation. The review of an ethics committee is done to protect the rights and welfare of research participants.

Can I withdraw my participation in this study and what are my rights?
Your participation is voluntary, you are not required to participate in this study you do not wish to do so. If you agree to participate but later change your mind, you can stop the interview at any time. There is no penalty or consequence of any kind if you decide not to participate. You

may refuse to answer any questions during the interview. What you decide will not affect your work in any way.

Declaration of potential conflicts of interest
Researchers in this study are interested in the knowledge gained from research. Researchers may get a salary or other financial support for conducting research.

Who do I contact if I have questions about the study?
Take as long as you want before making the decision to participate in this study. We are happy to answer any questions you have about this study. If you have questions about this study or if you have a problem with the investigation, please contact the principal investigator, Dr. Ezequiel Garcia Elorrio, phone +541147778767 or Ms. Mercedes Colomar, phone +5982 4864175.

If you have questions about your rights as a research participant, please contact the Ministry of Health of Nicaragua.

Conclusion
Do you have any questions? Yes: _____ No: _____

Do you agree to be interviewed? Yes: _____ No: _____

Certificate of Consent
Formative research to determine the views of health professionals on how to finish delivery in low-risk pregnancies

I have read this form and have decided to participate in the research project described above. Its general objectives, the participation data and the possible risks and inconveniences have been explained to my satisfaction. I understand that I can withdraw at any time. My signature indicates that I have received a copy of this consent form.

Signature of Participant	**Date**
Person Obtaining Consent	**Date**

Annex 5. The Evidence: Strategies to Reduce Cesarean Birth

Most of the evidence related to interventions implemented to reduce cesarean births was summarized in three comprehensive reviews: an overview developed by the Agency for Healthcare Research and Quality,[25] a systematic review from Khunpradit et al. published in the Cochrane Library[26] and a meta-analysis performed by Chaillet et al.[16] These reviews emphasize that there is no single intervention that will be effective in reducing cesarean birth rates in all women and in all settings.

The Agency for Healthcare Research and Quality concluded from their analysis that:

- No single intervention strategy was uniformly successful in reducing cesareans.
- The strength of evidence was low to insufficient for all interventions.
- No approach dominated as a strategy appropriate to reduce use of cesarean in low-risk women in the United States.

Khunpradit et al. concluded that the following interventions may be beneficial in some settings and for some cases:

- Implementation of guidelines with mandatory second opinion, particularly in the case of intrapartum cesareans
- Peer review, including pre-cesarean consultation, mandatory secondary opinion and post-cesarean surveillance, particularly for women with history of previous cesarean birth
- Guidelines disseminated with endorsement and support from local opinion leaders, particularly for women with history of previous cesarean birth
- Nurse-led relaxation classes and birth preparation classes in women with "low-risk" pregnancies

Chaillet et al. concluded that the cesarean birth rate can be safely reduced by interventions that involve health workers in analyzing and modifying their practice, including:

- Identification of barriers to change
- Multifaceted strategies, based on audit and detailed feedback

There is unfortunately a lack of studies on interventions tested in low-income countries. In addition, many of the interventions implemented to address barriers identified in Nicaragua to reduce unnecessary cesarean births, such as fear of litigation and differential payment for cesarean birth, do not have sufficient evidence and/or are culture-bound and would be difficult to implement or recommend.

In summary, it is clear that multifaceted interventions are needed to reduce unnecessary cesarean births and that they should strengthen facilitators and specifically address barriers identified in the formative research.

Table 1. Possible interventions to reduce cesarean birth rates for non-medical or obstetrical reasons

FACTOR	POTENTIAL INTERVENTIONS	RESEARCH
Lack of clear guidelines and/or awareness of guidelines	Develop consensus among key stakeholders using a modified version of the RAND Appropriateness Method (RAM) to develop guidelines for cesarean births [http://www.rand.org/content/dam/rand/pubs/monograph_reports/2011/MR1269.pdf]	Ostovar et al. (2010) [29]
	Use decision aids	Montgomery (2004) [30]; Shorten et al. (2005) [31]
	Implementation of guidelines with support from local opinion leaders (facilitators)	Althabe 2004 [17]; Khunpradit et al. (2011) [26]; Lomas et al. (1991) [32]
Provider perception that cesarean operations are beneficial	Provide informational materials describing evidence on risks and benefits of vaginal delivery compared to cesarean section, and accepted indications for cesarean birth	Davis (1997) [33]
	Initiate post-cesarean surveillance and provide feedback on maternal and perinatal outcomes to providers	Liang et al. (2004) [34]
Lack of a management system with audits/Performing cesareans as a convenience to the physician	Mandate pre-cesarean consultation and mandatory second opinion	Poma (1998) [35]; Khunpradit et al. (2011) [26]
	Discontinue the practice of performing cesarean operations to provide medical interns with experience, using arguments of medical ethics and patient rights	
	Initiate peer review feedback (audits)	Khunpradit et al. (2011) [29]
	Conduct regular audits of trends and provide feedback of data to the organizational unit (hospital, department, labor and delivery staff)	Khunpradit et al. (2011) [29]
Lack of continuing education	Conduct regular educational workshops focusing on the recommendations in practice and evidence for them	Davis (1997) [33]
	Provide on-the-job continuing education	Davis (1997) [33]
Patient-initiated elective cesarean birth	Promote women's education about the risks and benefits of vaginal delivery compared to cesarean section, with informational materials and health education talks during pregnancy	Khunpradit et al. (2011) [29]; "Inne-CESAREA": A Spanish language campaign against unnecessary cesareans [http://www.inne-cesarea.org/ http://www.vbac.com/2012/03/inne-cesarea-a-spanish-language-campaign-against-unnecessary-cesareans/]
	Provide prenatal education and support programs on vaginal birth after cesarean section	Fraser et al. (1997) [36]
	Familiarize care providers and childbirth educators with the social influences impacting women's decisions for mode of delivery so that truly informed choice discussions can be undertaken	Munro et al. (2009) [37]
	Promote nurse-led relaxation classes and birth preparation classes	Khunpradit et al. (2011) [29]; Bastani et al. (2005) [38]
	Provide sensitivity training on client-provider interaction to all staff working in the labor and childbirth unit	Change project [http://www.manoffgroup.com/ms_toolkit/psc_kenya/overview_provider.html] [39]
	Promote labor support for the woman—family member, doula, staff	Hodnett et al. (2011) [40]

FACTOR	POTENTIAL INTERVENTIONS	RESEARCH
Lack of human and material resources	Monitor labor progress and maternal/fetal condition in all women using the partograph	WHO (2003) [41]
	Dialogue with administration and managers to improve staff to patient ratio and availability of commodities, equipment and medications	
Fear of legal actions due to malpractice	Foster doctor-patient relationships that facilitate bonding and trust	Mechanic and Schlesinger (1996) [http://jama.ama-assn.org/content/275/21/1693.abstract] [42]
	Incorporate bedside manner techniques to preempt litigation as opposed to maintaining a reactive posture, or worse, practicing defensive medicine, including unnecessarily performing cesarean operations	Bucco (2006) [http://law.bepress.com/cgi/viewcontent.cgi?article=7390&context=expresso] [43]
	Support tort reform caps on noneconomic damages and pretrial screening panels	Yang et al. (2009) [44]; Kessler (2011) [45]
Differential payment for cesarean operations in the private sector	Reduce fee/reimbursement differentials between vaginal and cesarean births	Gruber et al. (1998) [46]

References

1) Villar J et al. Caesarean delivery rates and pregnancy outcomes: the 2005 WHO global survey on maternal and perinatal health in Latin America. *Lancet* 2006 Jun 3; 367(9525): 1819–1829.

2) Faúndes A, Cecatti JG. Which policy for caesarian sections in Brazil? An analysis of trends and consequences. *Health Policy Plan* 1993; 8: 33–42.

3) Barros FC, Vaughan JP, Victora CG, Huttly SRA. Epidemic of caesarean sections in Brazil. *Lancet* 1991; 338: 167–169.

4) Murray SF, Serani Pradenas F. Caesarean birth trends in Chile, 1986 to 1994. *Birth* 1997; 24: 258–263.

5) Notzon FC, Cnattingius S, Bergsjö P, et al. Caesarean section delivery in the 1980s: International comparison by indication. *Am J Obstet Gynecol* 1994; 170: 495–504.

6) Ballacci F, Medda E, Pinnelli A, Spinelli A. Caesarean delivery in Italy: A European record. *Epidemiol Prev* 1996; 20: 105–106.

7) Belizán JM, Althabe F, Barros FC, Alexander S. Rates and implications of caesarean section in Latin America: ecological study. *BMJ* 1999; 319: 1397–400.

8) Stjernholm YV, Petersson K, Eneroth E. Changed indications for cesarean sections. *Acta Obstet Gynecol Scand 2010*; 89: 49–53.

9) Betrán AP, Merialdi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P, Wagner M. Rates of caesarean section: analysis of global, regional and national estimates. *Paediatr Perinat Epidemiol* 2007; 21: 98–113.

10) Souza JP, Gülmezoglu AM, Lumbigano P, Carroli G, Fawole G, and Ruyan P. Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004–2008 WHO Global Survey on Maternal and Perinatal Health. *BMC Medicine* 2010; 8: 71.

11) Canadian Institute for Health Information. *Giving Birth in Canada: Providers of Maternity and Infant Care*. Ottawa. Canada: CIHI; 2004.

12) World Health Organization: Appropriate technology for birth. *Lancet* 1985; 326(8452): 436–437.

13) Robson MS, Scudamore IW, Walsh SM. Using the medical audit cycle to reduce cesarean section rates. *Am J Obstet Gynecol* 1996; 174(1): 199–205.

14) Main EK. Reducing Cesarean Birth Rates with Data-driven Quality Improvement Activities. Pediatrics 1999, 103:374–83.

15) Chaillet N, Dube E, Dugas M, Francoeur D, Dube J, Gagnon S, Poitras L, Dumont A. Identifying barriers and facilitators towards implementing guidelines to reduce cesarean section rates in Quebec. *Bull World Health Org* 2007; 85(10):791–797.

16) Chaillet N, Dumont A. Evidence-based strategies for reducing cesarean rates: A Meta analysis. *Birth* 2007; 34(1): 53–64.

17) Althabe F, Belizán JM, Villar J, Alexander S, Bergel E, Ramos S, Romero M, Donner A, Lindmark G, Langer A, Farnot U, Cecatt JGi, Carroli G, Kestler E, for the Latin American Caesarean Section Study Group. Mandatory second opinion to reduce rates of unnecessary caesarean sections in Latin America: a cluster randomized controlled trial. *The Lancet* 2004; 363: 1934–1940.

18) Kristensen MO, Hedegaard M, Secher NJ. Can the use of caesarean section be regulated? A review of methods and results. *Acta Obstet Gynecol Scand* 1998; 77: 951–960.

19) Walker R, Turnbull, D, Wilkinson C. Strategies to address global caesarean section rates: a review of the evidence. *Birth* 2002; 29: 28–39.

20) National Development Information Institute (DHS 2006-2007). *Encuesta Nicaragüense de Demografía y Salud 2006/07: INIDE Informe Final* [Nicaraguan Demographic and Health Survey 2006/07: Final INIDE Report]. Managua, Nicaragua, 2008.

21) World Health Organization. Rising caesarean deliveries in Latin America: How best to monitor rates and risks. WHO/RHR/09.05. WHO: Geneva; 2009.

22) Pan American Health Organization. "Country Health Profile, Nicaragua" from *Health in the Americas*, 2007.Volume II. Available at: http://www.paho.org/English/sha/prflnic.htm. Accessed January 12, 2011.

23) *ACOG Practice Bulletin* #115, "Vaginal Birth after Previous Cesarean Delivery," August 2010.

24) Sánchez-González JM, Tena-Tamayo C, Campos-Castolo EM, Hernández-Gamboa LE, Rivera-Cisneros AE. Medicina defensiva en México: Una encuesta exploratoria para su caracterización. *Cir Cir* 2005; 73(3): 199–206.

25) Agency for Healthcare Research and Quality. U.S. Department of Health and Human Services (AHRQ) 2012. http://www.effectivehealthcare.ahrq.gov/ehc/products/263/925/Cesarean_Draft-Report_20120109.pdf (Last accessed January 25, 2012)

26) Khunpradit S, Tavender E, Lumbiganon P, Laopaiboon M, Wasiak J, Gruen RL. Non-clinical interventions for reducing unnecessary caesarean section. *Cochrane Database of Systematic Reviews* 2011, Issue 6. Art. No.: CD005528. DOI: 10.1002/14651858.CD005528.pub2.

27) Grol R, Grimshaw J: From best evidence to best practice: effective implementation of change in patients' care. *Lancet* 2003; 362: 1225–1230.

28) Oxman AD, Thomson MA, Davis DA, Haynes RB. No magic bullets: A systematic review of 102 trials of interventions to help health care professionals deliver services more effectively or efficiently. *C M A J* 1995; 153: 1423–1431.

29) Ostavar et al. 2010. Develop consensus among key stakeholders using a modified version of the RAND Appropriateness Method (RAM) to develop guidelines for cesarean births. Available at: http://www.rand.org/content/dam/rand/pubs/monograph_reports/2011/MR1269.pdf.

30) Montgomery AA, DiAMOND Study Group. The DiAMOND trial protocol: A randomised controlled trial of two decision aids for mode of delivery among women with a previous caesarean section [ISRCTN84367722]. *BMC Pregnancy and Childbirth* 2004; 4: 25–32.

31) Shorten A, Shorten B, Keogh J, West S, Morris J. Making choices for childbirth: A randomised controlled trial of a decision-aid for informed birth after cesarean. *Birth* 2005; 32(4): 252–261.

32) Lomas J, Enkin M, Anderson GM, Hannah WJ, Vayda E, Singer J. Opinion leaders vs adult and feedback to implement practice guidelines-delivery after previous cesarean section. *JAMA* 1991; 265: 2202–2207.

33) Davis et al. A systematic review of theoretic concepts, practical experience and research evidence in the adoption of clinical practice guidelines. *Can Med Assoc J* 1997; 157: 408–416.

34) Liang WH, Yuan CC, Hung JH, Yang ML, Yang MJ, Chen YJ. Effect of peer review and trial of labor on lowering cesarean section rates. *Journal of the Chinese Medical Association* 2004; 67: 281–286.

35) Poma PA. Effect of departmental policies on cesarean delivery rates: a community hospital experience. *Obstetrics and Gynecology* 1998; 91: 1013–1018.

36) Fraser W, Maunsell E, Hodnett E, Moutquin J-M. Randomized controlled trial of a prenatal vaginal birth after cesarean section education and support program. *American Journal of Obstetetrics and Gynecology* 1997; 176: 419–425.

37) Munro S, Kornelsen J, Hutton E. Decision making in patient-initiated elective cesarean delivery: the influence of birth stories. *J Midwifery Women's Health*. 2009 Sep-Oct; 54(5): 373–379.

38) Bastani F, Hidarnia A, Kazemnejad A, Vafaei M, Kashanian M. A randomized controlled trial of the effects of applied relaxation training on reducing anxiety and perceived stress in pregnant women. *Journal of Midwifery & Women's Health* 2005; 50(4): e36–e40.

39) Change project [http://www.manoffgroup.com/ms_toolkit/psc_kenya/overview_provider.html]

40) Hodnett et al. (2011) Promote labor support for the woman – family member, doula, staff.

41) WHO (2003) Monitor labor progress and maternal/fetal condition in all women using the partograph.

42) Mechanic and Schlesinger (1996). Available at: http://jama.ama-assn.org/content/275/21/1693.abstract.

43) Bucco (2006). Available at: http://law.bepress.com/cgi/viewcontent.cgi?article=7390&context=expresso.

44) Yang YT, Mello MM, Subramanian SV, Studdert DM. Relationship between malpractice litigation pressure and rates of cesarean section and vaginal birth after cesarean section. *Medical Care* 2009; 47(2): 234–242. [PMC free article][PubMed]

45) Kessler DP. Evaluating the Medical Malpractice System and Options for Reform. *J Econ Perspect* 2011 Spring; 25(2): 93–110. Available at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3195420/.

46) Gruber J, Mayzlin D, Kim J. *Physician Fees and Procedure Intensity: The Case of Cesarean Delivery*. NBER Working Paper No. 6744 (October 1998). Available at: http://www.nber.org/papers/w6744.pdf?new_window=1.