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## Baseline Assessments of Essential Obstetric Care: Bolivia, Ecuador, and Honduras





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The Quality Assurance Project (QAP) is funded by the U.S. Agency for International Development (USAID), under Contract Number HRN-C-00-96-90013. QAP serves countries eligible for USAID assistance, USAID Missions and Bureaus, and other agencies and nongovernmental organizations that cooperate with USAID. The QAP team consists of prime contractor Center for Human Services (CHS); Joint Commission Resources, Inc. (JCR); and the following entities at the Johns Hopkins University: the School of Hygiene and Public Health (JHSPH), Center for Communication Programs (JHU/CCP), and the Program for International Education in Reproductive Health (JHPIEGO). QAP provides comprehensive, leading-edge technical expertise in the design, management, and implementation of quality assurance programs in developing countries. CHS, the nonprofit affiliate of University Research Co., LLC (URC), provides technical assistance in the design, management, improvement, and monitoring of healthcare systems in over 30 countries.



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## Abstract

In an attempt to address high maternal mortality and morbidity in Latin America and the Caribbean, the United States Agency for International Development (USAID) began the Latin America and Caribbean Regional Initiative to Reduce Maternal Mortality (LAMM) in 1996. Recognizing that existing USAID-supported programs already address family planning, prenatal care, and clean delivery strategies to reduce maternal mortality, LAMM targets essential obstetric care at the first level of referral facilities. Bolivia, Ecuador, and Honduras were sites for the development and pilot testing of essential obstetric care (EOC) interventions.

Under LAMM, the Quality Assurance Project (QAP) is responsible for supporting process redesign and quality improvement teams as they address weak components in the EOC system. QAP conducted a baseline assessment of the quality of care and compliance with EOC standards at the facility level in a selected area of each country in 1998. The QAP LAMM team developed a set of 21 indicators to measure quality of care and how each system was functioning. Data on the indicators were collected through the review of patient medical records and other facility records, structured observation of deliveries, and a questionnaire completed by healthcare professionals.

The assessments indicate that adequate infrastructure to provide EOC exists in all three study areas. However, deficits were documented in the capacity of these facilities to deliver quality EOC services.

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## Abstract *Continued*

Inadequate supplies and equipment, lack of trained personnel, and failure to comply with quality standards all limit the functional access to EOC. The assessments also suggest that low utilization of the study facilities is an important barrier to the delivery of EOC in all three countries.

Over a third of the staff surveyed reported never having been trained in the management of obstetrical emergencies. With respect to the performance of clinical EOC tasks, the assessments found that time intervals between recordings of fetal heart rate failed to meet international standards. Asepsis was routinely practiced during delivery in all three countries, while the administration of hemoglobin tests to patients whose admitting diagnosis suggested the possibility of hemorrhage varied widely among the three countries. The assessments also examined whether basic tasks were recorded in patients' medical records, and many tasks appeared unrecorded.

The assessment results suggest that a variety of interventions will be required to increase awareness of and compliance with performance standards. Such interventions could include effectively disseminating and communicating standards, in-service training, job aids, increased supervision and monitoring, and assuring availability of supplies and equipment through process redesign and quality improvement.

The LAMM initiative contemplates repeating assessments in 2001 to evaluate the effectiveness of its efforts. The adequacy of the 21 indicators to reliably measure the initiative's achievements should be reviewed, and efforts should be made to better standardize data collection instruments and sampling methods. Some of the original indicators may be hard to interpret as gauges of progress, and there may be other indicators that should be introduced. A new set of nine indicators, including five of the original ones, has been introduced by LAMM for routine quality monitoring. These indicators should be considered for future facility assessments.

## Acknowledgements

The baseline assessments of the delivery of essential obstetric care were carried out by teams of national professionals in Bolivia, Ecuador, and Honduras under the overall guidance and direction of staff from the Quality Assurance Project (QAP): Dr. Jorge Hermida, Associate Director for Latin America, and Dr. Barbara Kerstiens, Senior Quality Assurance Advisor at QAP for Johns Hopkins University.

In Bolivia, the fieldwork was directed by Dr. Gonzalo Fernández, then QAP's Field Coordinator for the Latin America and Caribbean Regional Initiative to Reduce Maternal Mortality. It was conducted by Licenciada Riosed Paredes and Miss Patricia Lima with the cooperation of personnel of the Chiquitania Norte Health District in the Department of Santa Cruz. Dr. Jenny Romero, QAP Field Coordinator in Bolivia, and Dr. Stephane Legros, Senior Quality Assurance Advisor at QAP for Johns Hopkins University, assisted in the analysis and presentation of the results.

In Ecuador, the baseline assessment was carried out in coordination with the National Directorate of Promotion and Integral Health Care of the Ministry of Public Health and the Directorate of Health of the Province of Cotopaxi. The fieldwork was coordinated by Dr. Cecilia Falconi. The data collection team consisted of Obstretriz Linda Guayaquil, Obstretriz Sandra Mendez, Dr. Luis Vaca, Dr. Carlos Alvarez, Licenciada Angela Bermeo, Dr. Miguel Medina, and Licenciada Teresa Landazuri.

The baseline assessment in Honduras was implemented in coordination with the General Directorate of Population Risks of the Secretariat of Health and Regional Directorate No. 2 Comayagua. The data collection was coordinated by Dr. Miguel A. Zúniga and included Dr. Gustavo A. Valladares, Dr. Lorena Zelaya, Dr. Hector R. Ramirez, and Dr. Ricardo A. Fernández. Dr. Marco Castro, QAP Field Coordinator in Honduras, assisted in the interpretation and presentation of the results.

Data from the three assessments were processed and analyzed in Quito, Ecuador by Drs. Patricio Ayabaca and Marco Pino. This summary in English was written by Mrs. Lani Marquez, based on the country reports in Spanish prepared by Drs. Ayabaca and Pino with suggestions from the respective country teams.

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# Baseline Assessments of Essential Obstetric Care: Bolivia, Ecuador, and Honduras

Lani Marquez

## Acronyms

CEPAC	Centro de Promoción Agropecuaria Campesina
EOC	Essential Obstetric Care
IEC	Information, Education, and Communication
IR	Intermediate Result
JSI	John Snow, Inc.
LAMM	Latin America and Caribbean Regional Initiative to Reduce Maternal Mortality
MHSW	Ministry of Health and Social Welfare (Bolivia)
MPH	Ministry of Public Health (Ecuador)
NA	Not Applicable
NGO	Nongovernmental Organization
PAHO	Pan American Health Organization
PRODIM	Programa para el Desarrollo de la Infancia y la Mujer
QAP	Quality Assurance Project
SACOA	Servicio de Asesoría a Comunidades Agrarias
SH	Secretariat of Health (Honduras)
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

## I. Introduction

### A. LAMM

Recognizing high maternal mortality and morbidity in Latin America and the Caribbean, the United States Agency for International Development (USAID) began a regional initiative in 1996 to increase the effectiveness of essential care of obstetrical complications. Known as the Latin America and Caribbean Regional Initiative to Reduce Maternal Mortality (LAMM), this initiative focuses on reducing maternal mortality from direct causes. Since existing USAID-supported programs were already addressing family planning, prenatal care, and clean delivery strategies to reduce maternal mortality, LAMM targets essential obstetric care (comprised of basic and emergency obstetric care and newborn care) at the first level of referral facilities. Three countries in the region were selected as sites for the development and pilot testing of interventions: Bolivia, Ecuador, and Honduras.

The implementing agencies for LAMM are the Pan American Health Organization (PAHO); John Snow, Inc. (JSI); and the USAID-funded Quality Assurance Project. PAHO works with governments in 11 countries of the region to promote policies that will improve and maintain the quality of maternal services and increase community access to essential obstetric care (EOC). It also provides technical

support for national maternal mortality coordinating committees and facilitates information sharing within the region. It works at the national level in the three pilot intervention countries, coordinating with USAID and its cooperating agencies.

JSI (originally through its MotherCare Project) works in partnership with local nongovernmental organizations (NGOs) in the three pilot countries. JSI is responsible for managing LAMM information, education, and communication (IEC) and community mobilization activities. In Bolivia, JSI contracted with Servicio de Asesoría a Comunidades Agrarias (SACOA), a local NGO that operates facilities in the study area. In Ecuador, Plan International was contracted to strengthen community capacity to access EOC services and build links between the community and healthcare services. In Honduras, Programa para el Desarrollo de la Infancia y la Mujer (PRODIM) is the NGO.

The Quality Assurance Project (QAP) is responsible for developing, testing, evaluating, and disseminating approaches to enhance the use of protocols, standards, and guidelines at the first level of referral for EOC. QAP was asked to conduct a baseline assessment of the quality of care and compliance with EOC standards at the facility level in the selected intervention areas. QAP is also supporting the efforts of quality design teams made up of providers

and community members to address weak components in the EOC system, including community mobilization, information and communication, referrals, training, triage, prenatal care, labor and delivery, care of the newborn, and management of obstetrical complications.

This report presents the results of the QAP-supported facility baseline assessments of EOC in the pilot sites.

## B. Definition of Essential Obstetric Care

In 1986, the World Health Organization (WHO) convened a technical working group to define the essential obstetric care necessary at the first referral level to reduce maternal mortality and morbidity. It also sought to describe the staff, training, supervision, facilities, equipment, and supplies needed to provide such care. Building on this work, the LAMM initiative has defined EOC as a set of eight basic care functions that are continuously available and performed by physicians capable of treating obstetrical emergencies:

- Surgery (cesarean section, hysterectomy, repair of laceration, episiotomy)
- Anesthesia
- Clinical treatments
- Blood transfusions
- Manual procedures (e.g., extraction of placenta)
- Monitoring of labor
- Management of pregnancy complications
- Neonatal care (thermal control, resuscitation, etc.)

To operationally define EOC capacity in the baseline facility assessments, the LAMM team drew on international standards for what constitutes the capability to provide EOC. WHO, the United Nations Children's Fund (UNICEF), and the United Nations Fund for Population Activities (UNFPA) had jointly developed a set of criteria to measure the capability of facilities to provide EOC (WHO, UNICEF, and UNFPA 1997). These guidelines define facilities as capable of providing either "basic" or "complete" EOC, according to the services that the facilities routinely offer (Table 1).

The baseline facility assessments used the WHO/UNICEF/UNFPA definitions of basic and complete essential obstetric care to measure EOC capacity. In addition, the LAMM teams in each country applied another, more comprehensive set of criteria to measure the availability of EOC on a continuous basis. These criteria categorized facilities as fully,

partially, or not complying with the following five conditions:

- Care is available 24 hours a day
- At least some of the personnel in the facility have received training in maternal/child care or EOC in the past two years
- Availability of physical infrastructure: delivery room, gynecological table, taboret, and lamp
- Availability of minimum equipment: stethoscope, scissors, intravenous equipment, long syringe, tensiometer, infant scale, autoclave, oral thermometer, vacuum extractor, sterile gowns, vaginal speculums, forceps, fetal stethoscope, and bulb syringe to aspirate secretions of the newborn
- Availability of medicines and supplies: gloves, needles, suture material, diazepam, ampicillin, oxytocin, antiseptics, and intravenous solutions

Table 1  
Criteria for Basic and Complete Essential Obstetric Care

Basic EOC	Complete EOC
Parenteral administration of antibiotics	Parenteral administration of antibiotics
Parenteral administration of oxytocins	Parenteral administration of oxytocins
Parenteral administration of anticonvulsants for pre-eclampsia or eclampsia	Parenteral administration of anticonvulsants for pre-eclampsia or eclampsia
Manual extraction of the placenta	Manual extraction of the placenta
Extraction of chorio-placental fragments	Extraction of chorio-placental fragments
Assisted vaginal delivery	Assisted vaginal delivery
	Surgery (cesarean sections)
	Blood transfusions

The emphasis of the latter criteria on the continuous availability of care was designed to allow the LAMM teams to measure achievement of one of the key Intermediate Results defined by USAID for the LAMM Initiative, IR 2.4: "Increase in the number of facilities in the pilot countries where EOC is provided 24 hours per day, according to national standards."

To measure whether EOC services were operationally available 24 hours a day, facilities were classified according to their degree of compliance with the five conditions:

- Fully complies with these conditions (Type A facility)
- Partially complies with these conditions by virtue of having the necessary infrastructure, 24-hour care, and trained personnel, but with deficits in equipment, medicines, and/or supplies (Type B facility). In this sense, Type B facilities have the ready potential to achieve Type A status.
- Does not comply with these conditions (Type C facility)

The Type A, B, and C classifications were applied in each country through use of a rapid assessment conducted shortly before the more comprehensive baseline facility assessments were initiated in Ecuador and Honduras and shortly after the baseline assessment in Bolivia. The rapid assessments were carried out to obtain data on IR 2.4 for USAID's annual results reporting. They were performed in the same areas as the baseline facility assessments, although in some cases different facilities were surveyed. The rapid assessments were repeated in 1999 and would be repeated again in 2000 in each study area.

Table 2  
National Indicators for the LAMM Intervention Countries (1997)

Indicator	Bolivia	Ecuador	Honduras
Population	7,900,000	12,200,000	5,900,000
Percentage of population living in rural areas	37	39	54
Maternal mortality rate (per 100,000 live births)	370	150	168
Infant mortality rate (per 1000 live births)	66	33	36
Percentage of deliveries attended by healthcare personnel	56	59	54

Sources: Except as indicated, data are from the World Bank (2000). The maternal mortality rate figure for Honduras was taken from Quality Assurance Project (1998).

### C. Background on Each Country and Study Site

Ecuador, Honduras, and Bolivia were selected by USAID as the focus countries for QAP and JSI activities under LAMM. Selection was based on country interest and opportunities to build on existing USAID-funded work to develop effective interventions to increase access to and quality of EOC. Table 2 shows that each country faced a significant maternal mortality challenge. It was expected that EOC interventions that could be developed and field tested in pilot districts in these countries could be applied in other settings in Latin America.

Within each country, a specific geographic area was defined where team-based quality design and improvement activities could be carried out at the facility and community levels to develop more effective systems for EOC. While certain activities would be pursued at the national level, especially with respect to standards development, most quality activities, including the baseline assessments, would take

place in the pilot areas, described below.

#### 1. Bolivia: Chiquitania Norte District/San Julián Municipality

The Bolivia site was selected by the local NGO that had been hired as the implementing agency for the community-based IEC activities. SACOA was selected through a competitive process. On the basis of its prior experience and service delivery sites in the area, SACOA proposed the municipality of San Julián, which is part of the Chiquitania Norte District of the department of Santa Cruz.

San Julián has four facilities: three hospitals operated by the Ministry of Health (the San Ramón District Hospital, Fortín Libertad Hospital, and Health Center-Hospital San Martín) and one health center (San Julián) operated by SACOA. All four participated in the baseline assessment.

#### 2. Ecuador: Cotopaxi Province

The National Directorate of Promotion and Integral Health Care of the Ministry of Public Health (MPH),

together with QAP and the Directorate of Health of the Province of Cotopaxi, selected the province of Cotopaxi as the site for LAMM activities. Cotopaxi is located in the mountainous center of the country and has a population of approximately 299,443; of that total, 72 percent reside in rural areas. While its birth rate is lower than the national average, infant mortality (estimated at 74 per 1000 live births) is substantially higher than the national average.

The province is divided into seven Health Areas; two were excluded from the study because they are located outside the mountainous region and their patients are usually referred to more easily accessible hospitals in other provinces.

The MPH operates five hospitals in Cotopaxi (in Latacunga, Pujilí, Salcedo, Zumbahua, and El Corazón), plus two Maternal Infant Care Centers (in Saquisilí and La Maná), all of which offer 24-hour care and can accommodate normal deliveries. The Cotopaxi Provincial Hospital in Latacunga offers the largest number of obstetrical beds (30) and is the only facility staffed to handle obstetrical emergencies requiring surgery. Other non-MPH facilities offering obstetrical care in the province include the Social Security Hospital (with nine obstetrical beds) and four private clinics (three in Latacunga and one in Salcedo).

### 3. Honduras: Health Region No. 2

The Secretariat of Health (SH) of Honduras selected Health Region No. 2, located in the center of the country and including the departments of La Paz, Intibucá, and

Comayagua, as the pilot area for LAMM. The total population of the region is 585,000. Its maternal mortality rate, at 212 deaths per 100,000 live births, is significantly higher than the national average. The region is divided into five Health Areas that include various municipalities. The intervention area was defined as the area covered by the municipalities of Comayagua, Ajuterique, Rosario, La Libertad, Villa San Antonio, and La Paz, which together have a population of 171,500 inhabitants, about 29 percent of the region's total population. Four facilities were assessed in the baseline study: Comayagua Hospital (the regional hospital), La Paz Hospital, La Libertad Maternal-Child Clinic, and Minas de Oro Maternal-Child Clinic.

## II. Objectives of the Baseline Assessments

The baseline facility assessments had three objectives. First, they were intended to provide an initial analysis of the quality of the EOC being provided in the study areas; the analysis would help direct the quality design and improvement activities that would be undertaken with QAP technical assistance. The second objective was to establish baseline levels for key indicators of service quality, which would be compared with a final evaluation of the same indicators after three years of intervention. A final objective was to establish a common basis for monitoring and evaluating EOC in the three countries.

## III. Methodology

### A. Study Design

In order to establish a common basis for comparing the quality of EOC in the three study countries, a set of indicators of EOC quality was developed by the QAP LAMM team, led in this activity by Dr. Barbara Kerstiëns. Using a systems framework to examine the inputs, processes, and outcomes of the obstetric care system, the team defined eight macro-level indicators that would provide an overall picture of how the system was functioning in each study area. To measure the quality of care in a particular facility, 13 micro-level indicators were developed. These indicators also followed the inputs, processes, and outcomes framework. The indicators and reference values are provided in tables in Section IV.

The baseline assessments were designed to provide data on these 21 indicators in the selected study areas. Data collection instruments were developed to guide the review of medical records and other facility records, carry out structured observation of deliveries, and provide a self-applied questionnaire for healthcare professionals. The instruments were first applied in Ecuador and Honduras and adapted later for use in Bolivia.

### B. Study Sites and Samples

The study sites are described in detail in Section I.C. In Bolivia, the study area was defined as the municipality of San Julián. All three hospitals (San Ramón, Fortín Libertad, and San Martín) and one health center (San Julián) in the area were included. In Ecuador, the study

universe was defined as the Cotopaxi Provincial Hospital and all hospitals and health centers in the mountainous zone of Cotopaxi Province that provide obstetric care and are located in the effective catchment area of the provincial hospital (Salcedo, Pujili, Zumbahua, and Saquisilí). In Honduras, the study universe was defined as all SH hospitals (Comayagua and La Paz) and a sample of health centers providing obstetric services in the municipalities of Comayagua, Ajuterique, Rosario, La Libertad, Villa San Antonio, and La Paz (La Libertad and Minas de Oro). The three study areas differ considerably in population size and related characteristics (Table 3).

### C. Data Sources and Instruments

The QAP LAMM team, led by Drs. Barbara Kerstiëns and Jorge Hermida, developed standard data collection instruments that were applied with minor modifications in each country. Table 4 shows the sample size for each instrument used in each country.

For the medical record review, every clinical record of the obstetric services was reviewed in the four facilities in Bolivia. A simple random sampling strategy was applied to medical records in each of the four study facilities in Honduras. In Ecuador, records were taken for all patients discharged from the obstetrics service in Cotopaxi Hospital in February, April, June, August, October, and December 1997 (to account for possible seasonal variations) and for all obstetrics discharges for that year in the other four facilities.

Table 3  
Population Covered by Facilities Sampled in Study Areas

Country/Study Area	Population of Study Area	Expected Number of Births in 1997 and (% of Total Population)	Number of Facilities Studied
Bolivia/Chiquitania Norte	54,004	2056 (3.81)	3 hospitals and 1 health center
Ecuador/Cotopaxi Province	251,604	9996 (3.97)	4 hospitals and 1 maternal-child health center
Honduras/Health Region No. 2	584,278	21,386 (3.66)	2 hospitals and 2 maternal-child centers

To determine drug availability, data collection teams used a checklist to inspect the drug register for 1997 in each study hospital.

The sampling approach for observation of the practice of asepsis in normal deliveries and cesarean sections did vary considerably among the three study countries. In Bolivia, 12 deliveries were observed in three of the four study facilities, and cesarean sections were observed in the two facilities that perform this surgery (San Ramón and Fortín Libertad). In Ecuador, 52 deliveries were observed during August 1998 in the area referral center, Cotopaxi Hospital. In Honduras, 13 deliveries were observed in the two hospitals in Comayagua and La Paz.

For calculation of cesarean sections as a proportion of expected births, hospital records were reviewed to identify all cesarean sections that occurred in the study facilities during the reference year 1997. In Bolivia, 12 cesarean sections were identified in the medical records of two study facilities. In Ecuador, 361 cesarean sections were identified in the records of Cotopaxi, and another 272 were identified through inquiries to Social Security facilities and private facilities. In Honduras, records on cesarean sections were reviewed in the two study facilities (Comayagua and La Paz) that perform this surgery. Data on cesarean sections performed in the private sector were unavailable.

Table 4  
Data Collection Instruments and Samples by Study Area

Instrument	Bolivia	Ecuador	Honduras
Medical record review	500	1650	1164
Observation with checklist for compliance with asepsis during deliveries	12	52	13
Verification checklist for drug register/kardex	4	5	4
Self-applied questionnaire for healthcare professionals	5	31	61

In Bolivia, additional data were obtained from the register of health statistics for the Department of Santa Cruz, Chiquitania Norte District, and from SACOA's annual report of activities for 1997. In Ecuador, data were taken from the national Yearbook of Vital Statistics (1990–95), death registers from each of the MPH facilities in Cotopaxi Province, the civil register from each parish included in the study, and the MPH epidemiologic surveillance system.

#### D. Data Collection and Analysis

Data from each baseline assessment were entered and analyzed in the respective country using the statistical package Epi-Info 6.0. Standard definitions for the construction of indicators were used to ensure comparability between countries. Following the preliminary analysis carried out in each country, data were sent to the LAMM team in Quito, Ecuador for further analysis and preparation of the complete report on each baseline assessment.

### IV. Results and Discussion

#### A. Macro-Level Indicators

The eight macro-level indicators collected in the baseline assessment (Table 5) were selected to estimate the overall accessibility of essential obstetric care in the study areas, coverage of obstetrical complications, how the referral process is working, and frequency of cesarean sections and maternal deaths. Except where indicated, the data presented in this report for

Table 5  
Macro-Indicators of EOC Quality

Indicator	Reference Value
<i>INPUTS</i>	
1. Number of facilities providing EOC (WHO definition) per 500,000 inhabitants	WHO has established a standard of 1 facility providing complete EOC per 500,000 inhabitants and 4 facilities providing basic EOC per 500,000 inhabitants as adequate.
2. Proportion of facilities that have written standards for maternal and child healthcare	All facilities should have available written standards for maternal and child healthcare.
<i>PROCESSES</i>	
3. Coverage of expected delivery complications (number of patients with complications treated in EOC facilities as a proportion of expected number of patients with delivery complications)	A high proportion of delivery complications should be treated in facilities providing EOC.
4. Proportion of obstetric admissions to the EOC referral hospital in the study area that had been referred	While there is no minimum desired value for this indicator, it is expected that the proportion will increase as the quality of EOC improves in reference facilities.
5. Proportion of obstetric referrals with a written referral	While there is no minimum desired value for this indicator, it is expected that the proportion will increase as the quality of EOC improves in reference facilities.
<i>OUTCOMES</i>	
6. Cesarean sections as a proportion of total expected births	It is expected that the value for this indicator should fall between 5 and 15%.
7. Obstetric Case Fatality Rate in EOC facilities (number of maternal deaths as a proportion of total obstetric admissions)	While there is no specific desired value for this indicator, it is expected that the proportion will decrease as the quality of EOC improves in reference facilities.
8. Proportion of maternal deaths in the study area that occur in EOC facilities	There is no specific desired value for this indicator. With improvements in the quality of EOC, the number of deaths is expected to decrease, though the proportion of deaths occurring in EOC facilities may or may not decrease.

each country represent averages of the values of all the facilities studied.

Indicator 1 examines the infrastructure available to provide EOC. As shown in Table 6, the study areas

easily exceeded the WHO reference values for the recommended adequate number of facilities per 500,000 population (noted in Table 5, above).

Table 6  
Facilities Providing EOC per 500,000 Inhabitants

WHO Definition	Bolivia	Ecuador	Honduras
Basic EOC	27.7	7.9	11.7
Complete EOC	9.3	2.0	2.9

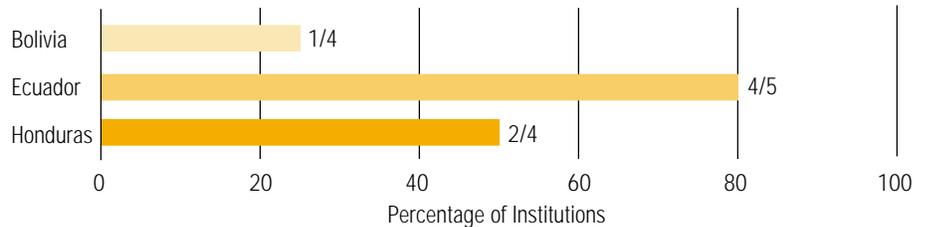
Indicator 1: All study facilities, 1998

Indicator 2 looks for the physical presence in healthcare facilities of manuals with maternal and child healthcare standards or procedures. Most of the facilities studied in Ecuador had written standards on hand; they were more limited in Honduras and Bolivia (see Figure 1).

Indicator 3 is the first of several baseline indicators that use the estimated number of births for the study area to project coverage. Table 7 shows coverage of expected delivery complications based on the international estimate that roughly 15 percent of pregnancies experience a delivery complication. "Delivery complication" was defined as any delivery with an admitting diagnosis that included any conditions other than normal delivery, as well as complications experienced during the delivery process that were recorded in the medical record.

The data were collected through medical record review. The higher proportion of expected complications seen in Honduras may be partially explained by the high prevalence of institutional delivery in the Honduran study area and the large volume of patients from other municipalities who deliver in the hospitals under study.

Figure 1  
Facilities with Written Maternal and Child Healthcare Standards



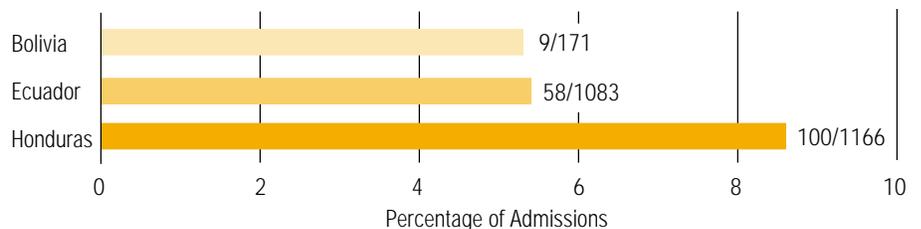
Indicator 2: All study facilities, 1998

Table 7  
Coverage of Expected Delivery Complications

	Bolivia	Ecuador	Honduras
Number of delivery complications treated in study facilities in 1997	92	515	2179
Number of expected delivery complications (15% of expected births)	308	1499	3208
Percentage of expected delivery complications treated at EOC facilities	29.9	34.3	67.9

Indicator 3: All study facilities, 1997

Figure 2  
Referred Obstetric Admissions

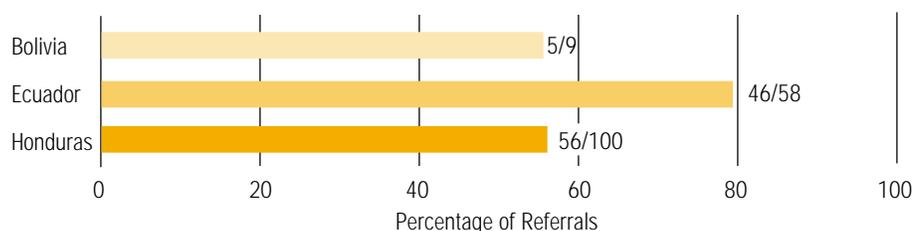


Indicator 4: Referral hospitals only, 1997

The next two indicators examine the referral of obstetric patients seen at the main referral hospital in each study area. Results for Indicator 4 (Figure 2) show a low level of referral from lower-level facilities to the referral hospital in all three countries.

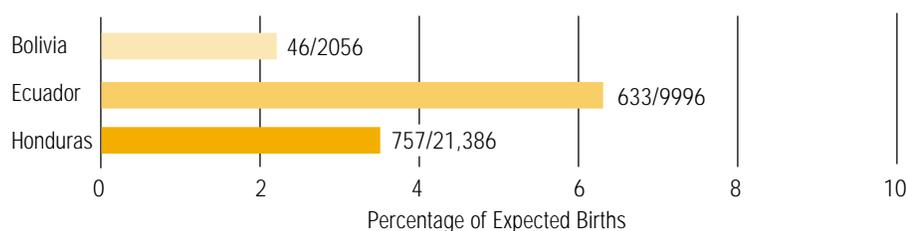
Indicator 5 measures the degree to which referred obstetric patients arrived with a written referral instrument. As shown in Figure 3, over half of the referred patients in each study area had written referrals.

Figure 3  
Obstetric Referrals with a Written Referral Instrument



Indicator 5: Referral hospitals only, 1997

Figure 4  
Cesarean Sections as a Proportion of Expected Births



Indicator 6: Bolivia and Ecuador: all facilities that perform cesarean sections; Honduras: only public facilities that perform cesarean sections, 1997

Table 8  
Obstetric Case Fatality Rate

	Bolivia	Ecuador	Honduras
Number of maternal deaths occurring in EOC facilities due to delivery	0	1	0
Total number of obstetric admissions	500	2560	7226
Maternal deaths per 10,000 obstetric admissions	0	3.9	0

Indicator 7: All study facilities, 1997

Table 9  
Maternal Deaths in EOC Facilities

	Bolivia	Ecuador	Honduras
Number of maternal deaths that occurred in study facilities	0	1	0
Total number of maternal deaths identified in the study area	2	5	0
Percentage of all maternal deaths that occurred in EOC facilities	0	20.0	NA

Indicator 8: All study facilities, 1997

Indicators 6, 7, and 8 constitute the outcome indicators for the macro-level of the baseline study. Indicator 6 shows the proportion of expected deliveries that were cesarean sections. Data on numbers of cesarean sections for the reference year 1997 were obtained from all hospitals and clinics in each study area that perform cesarean sections. Private clinics were included, except in Comayagua (Honduras) where data from private clinics were not available. Figure 4 presents these identified cases as a proportion of the expected number of births for each study area in the same period. The baseline results for Chiquitania Norte (Bolivia) and Comayagua (Honduras) are lower than international estimates that suggest that 5 to 15 percent of deliveries require cesarean sections.

Indicators 7 and 8 examine maternal deaths in the study area, first as a proportion of total obstetric admissions and then maternal deaths in EOC facilities as a proportion of all identified maternal deaths. The results in Table 8 indicate a very low obstetric case fatality rate in the study facilities. The findings in Table 9, showing the proportion of all detected maternal deaths in the study area that occurred in EOC facilities, suggest that obstetric emergencies are not reaching the facilities best equipped to handle them. The fact that no maternal deaths were identified in the Honduran study area in 1997 is probably the result of under-reporting, given the maternal mortality rate estimated for the study area. The LAMM team in Honduras reported that a study done by a SH researcher on maternal mortality in Health Regions 2 and 5 identified three maternal deaths that occurred in SH facilities in Region 2 and

overall 39 maternal deaths in the area during 1997 (Euceda 1998), although these deaths were not detected in the baseline assessment.

## B. Micro-Level Indicators

The second category of indicators was designed to measure the quality of EOC provided at the healthcare facility level. The micro-level indicators (Table 10) address questions of staff training and capability, availability of medications and equipment required to provide EOC, the process of obstetric care delivery, and maternal and fetal outcomes. As with the macro indicators, unless otherwise indicated, figures presented for each country constitute averages of values found for individual study facilities. While average values present an overall picture of EOC quality in each study area, it should be noted that in some cases averages might mask considerable variation between study facilities within a country.

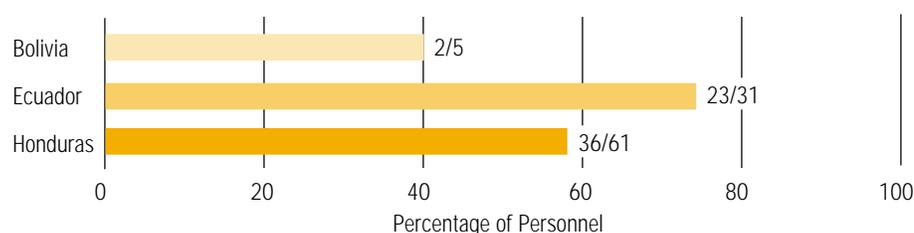
Indicator 9 covers staff training related to obstetric emergencies. As seen in Figure 5, a sizeable proportion of personnel surveyed reported having never received training in the management of obstetric complications.

Figure 6 shows findings for Indicator 10, the proportion of months when study facilities were fully supplied with oxytocin, according to facility records for 1997. A month was scored as “oxytocin unavailable” if the medication was out of stock for even one day during the month. While the average availability shown in Figure 6 for each country suggests that the majority of study facilities were fully supplied, results

Table 10  
Micro-Indicators of EOC Quality

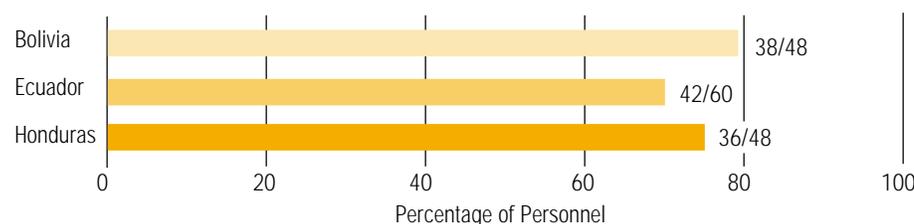
Indicator	Reference Value
<i>INPUTS</i>	
9. Proportion of professional personnel who have ever received training in obstetric complications	All professional personnel should have received training in obstetric complications.
10. Proportion of months when study facilities were supplied with oxytocin	All facilities should be supplied with oxytocin during every month of the year.
11. Proportion of study facilities with the minimum equipment needed to treat obstetrical emergencies	All EOC facilities should have the minimum equipment needed to treat obstetrical emergencies.
<i>PROCESSES</i>	
12. Proportion of deliveries in study facilities in which labor monitoring is recorded	Maternal blood pressure, fetal heart rate, and presence of vaginal bleeding should be recorded and monitored in all deliveries.
13. Average time between recordings of fetal heart rate	Fetal heart rate should be monitored every 30 minutes and recorded in the medical record.
14. Proportion of observed deliveries in which asepsis was practiced	Asepsis should be practiced in all deliveries.
15. Proportion of patients admitted with hemorrhage on whom a hemoglobin test was performed	All patients with an admitting diagnosis that includes blood loss should have their hemoglobin level evaluated.
16. Proportion of patients with admitting diagnosis of pre-eclampsia/eclampsia for whom basic tasks were registered in the medical record	All patients admitted with pre-eclampsia/eclampsia should have their blood pressure taken, intake and elimination of liquids monitored, be placed on bed rest, and be started on intravenous liquids, and these tasks should be recorded in the medical record.
<i>OUTCOMES</i>	
17. Proportion of maternal deaths in the study area in which a death audit was performed	A death audit should be performed in all cases of maternal death.
18. Cesarean sections as a proportion of total deliveries	It is expected that the value for this indicator should fall between 5 and 15%.
19. Proportion of obstetric patients with low hemoglobin who received blood transfusions in EOC facilities	There is no specific desired value for this indicator. While not all patients with low hemoglobin need a blood transfusion, with improvements in the quality of EOC, the proportion of such patients is expected to increase.
20. Proportion of obstetric patients in EOC facilities admitted with fetal death	While there is no specific desired value for this indicator, its value is expected to decrease as a result of improvements in prenatal care and access to EOC.
21. Proportion of deliveries in EOC facilities resulting in fetal death	While there is no specific desired value for this indicator, its value is expected to decrease as a result of improvements in the quality of EOC.

Figure 5  
Professional Personnel with Training in Obstetric Complications



Indicator 9: All study facilities in Honduras and Ecuador; two in Bolivia, 1998

Figure 6  
Months When Study Facilities Had Oxytocin



Indicator 10: All study facilities, 1997

Table 11  
Study Facilities with Minimum Equipment Needed to Treat Obstetrical Emergencies

	Bolivia	Ecuador	Honduras
Number of facilities studied	4	5	3
Number of facilities with minimum EOC equipment	3	4	2
Percentage of facilities with minimum EOC equipment	75.0	80.0	66.7

Indicator 11: All study facilities in Ecuador and Bolivia; three in Honduras, 1998

Table 12  
Deliveries Where Key Labor Monitoring Events Were Recorded

	Bolivia	Ecuador	Honduras
Number of facilities studied	4	5	4
Average proportion (percentage) of delivery admissions with the labor monitoring form in which blood pressure, fetal heart rate, and presence of vaginal bleeding were recorded	0/111 (0)	198/1113 (17.8)	142/873 (16.3)
Percentage range	NA	1.1 to 74.5	0 to 31.3

Indicator 12: All study facilities, 1997

for individual facilities revealed wide disparities between facilities. In both Honduras and Bolivia, three of the four facilities were fully supplied, while the fourth was never supplied (Honduras) or supplied for only two months (Bolivia). In Ecuador, four of the five study facilities experienced some months of unavailability, ranging from one to 11.

Indicator 11 addresses the availability of the minimum equipment needed to handle obstetric emergencies. The indicator was defined operationally as the presence of the following items, which represent a sample of the minimum material elements needed: tensiometer, stethoscope, scissors, long syringe, suture material, fetal stethoscope, and bulb syringe to aspirate secretions of the newborn. Table 11 shows that minimum equipment to attend obstetric emergencies was not available in one facility studied in each country. In Ecuador, the facility that did not meet this standard was Cotopaxi, the reference hospital.

The data for this indicator were taken from the rapid assessments carried out around the time of the full baseline facility assessments. Minas de Oro Hospital (Honduras) was not included in the rapid assessment and is therefore not included in the calculation of this indicator.

Indicators 12 and 13 examine the recording of information on labor monitoring in the medical records of obstetric patients. As seen in Table 12, a low proportion (less than 18 percent) of the medical records reviewed for obstetric patients had data recorded on maternal blood pressure, fetal heart rate, and the presence of vaginal bleeding. In Bolivia, medical records in only one

of the four facilities studied even included the necessary form to record this information. In Ecuador, the average figure of 17.8 percent masks the large variations among the five facilities, from 1.1 to 74.5 percent. In Honduras, no information on labor monitoring was found in records reviewed in two of the four facilities.

To further examine the quality of medical record keeping, in the instances where fetal rate was recorded, the time elapsed between recordings of fetal heart rate was used to calculate Indicator 13. Clinical standards in each of the countries indicate that fetal heart rate should be monitored every 30 to 60 minutes and recorded in the medical record. Table 13 shows that the frequency with which fetal heart rate was recorded fell far short of this standard.

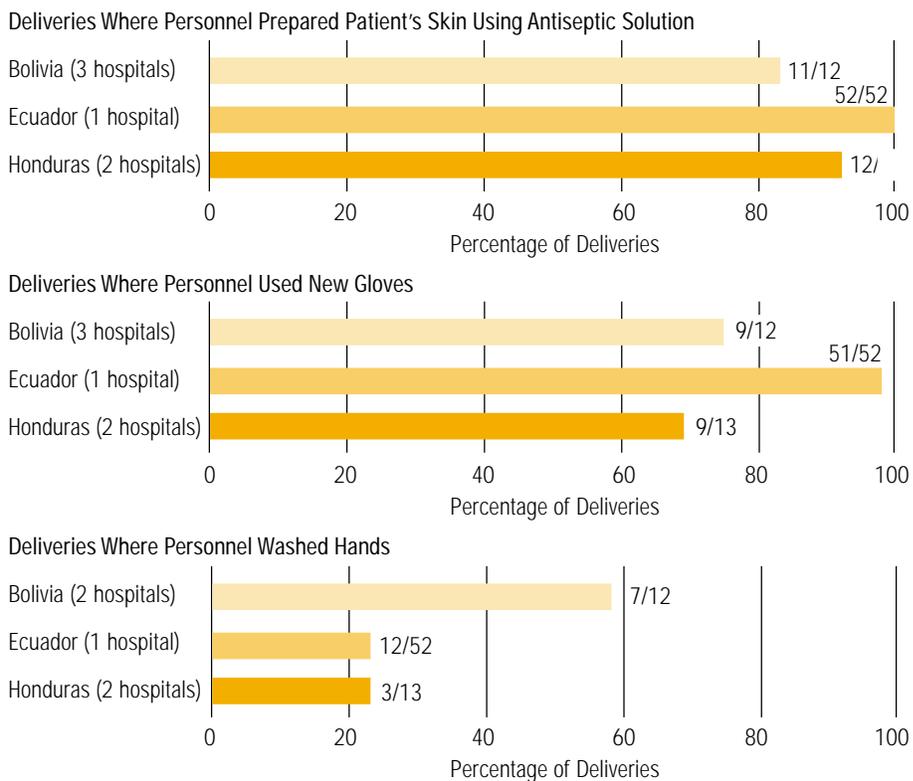
The quality of care provided in deliveries that were observed as part of the baseline assessments is measured by Indicator 14, which examined whether facility personnel assisting in deliveries practiced asepsis. As seen in Figure 7, the use of antiseptic to prepare the patient's skin was widely practiced in all three countries. Personnel in all three countries used new gloves in most cases observed. Hand washing was not widely practiced in either Ecuador or Honduras; in Bolivia it was performed in 58.3 percent of observed deliveries.

Table 13  
Time between Recordings of Fetal Heart Rate

	Bolivia	Ecuador	Honduras
Number of facilities with records	1	5	2
Average time between recordings of fetal heart rate	2 hours 11 minutes	1 hour 35 minutes	5 hours 7 minutes
Range	NA	49 to 106 minutes	NA

Indicator 13: All study facilities making such recordings, 1997

Figure 7  
Deliveries Where Asepsis Was Practiced



Indicator 14: Selected study facilities, 1998

Table 14  
**Patients Admitted with Hemorrhage on Whom Hemoglobin Test Was Performed and Recorded**

	Bolivia	Ecuador	Honduras
Number of facilities studied	3	4	2
Average proportion (percentage) of patients with an admitting diagnosis of conditions associated with hemorrhage and on whom a hemoglobin test was performed and recorded	0/19 (0)	106/148 (71.6)	144/157 (91.7)
Percentage range	NA	35.0 to 80.4	83.3 to 92.6

Indicator 15: Selected study facilities, 1997

Table 15  
**Deliveries with Admitting Diagnosis of Pre-eclampsia/Eclampsia Where Basic Tasks Were Performed and Recorded**

	Bolivia	Ecuador	Honduras
Number of facilities studied	3	4	3
Average proportion (percentage) of patients with an admitting diagnosis of pre-eclampsia/eclampsia for whom 4 key tasks were recorded in medical record	1/9 (11.1)	2/46 (4.3)	7/50 (14.0)
Percentage range	0 to 25.0	0 to 6.1	0 to 7.4

Indicator 16: Selected study facilities, 1997

Table 16  
**Maternal Deaths Where a Death Audit Was Performed and Reported**

	Bolivia	Ecuador	Honduras
Number of maternal deaths identified in the study area	2	5	39*
Percentage of maternal deaths in which a death audit was performed	0	0	0

Indicator 17, 1997

\* Source: Euceda (1998)

Evidence of the quality of care provided in cases with obstetric complications is found in Indicators 15 and 16, which reviewed medical records to determine whether records were made of the performance of key tasks that should be performed on patients with selected admitting diagnoses. Indicator 15 (Table 14) examines the proportion of cases with admitting diagnoses suggesting any sign of blood loss and on whom a hemoglobin test was performed and the result recorded in the medical record. The baseline assessments found that no hemoglobin tests were recorded in the 19 Bolivian cases identified where this test would have been appropriate. The majority of such patients identified in Ecuador and Honduras did receive a hemoglobin test.

Indicator 16 examines a similar process of care with respect to patients with an admitting diagnosis of eclampsia or pre-eclampsia. As seen in Table 15, overall a very low proportion of medical records of patients admitted in all three countries with this diagnosis showed evidence that key tasks, including taking blood pressure, monitoring fluid intake and elimination, placing the patient on bed rest, and initiating intravenous liquids, had been performed.

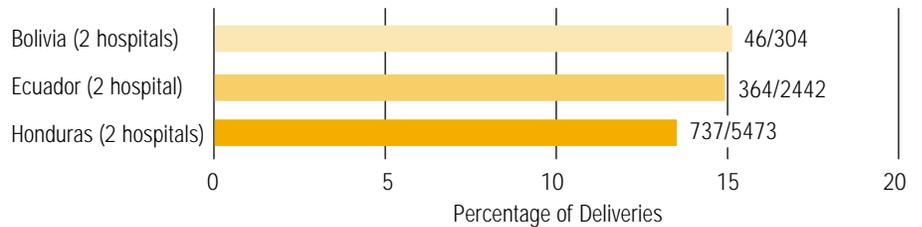
The last set of micro-indicators examines various outcomes of the obstetric care provided in the study areas. Indicator 17 looks at the completion of maternal death audits in the study areas. Table 16 shows that maternal death audits are not being performed by the studied facilities.

Indicator 18 examines the share of births in the study facilities that were cesarean sections. Only deliveries in facilities where cesarean sections are performed were included. As shown in Figure 8, the results were about 15 percent, the expected maximum, in all three countries.

Indicator 19 examines the provision of blood transfusions to patients with low or very low hemoglobin values. Figure 9 shows, for each country, the proportion of patients with three different low hemoglobin values who received blood transfusions.

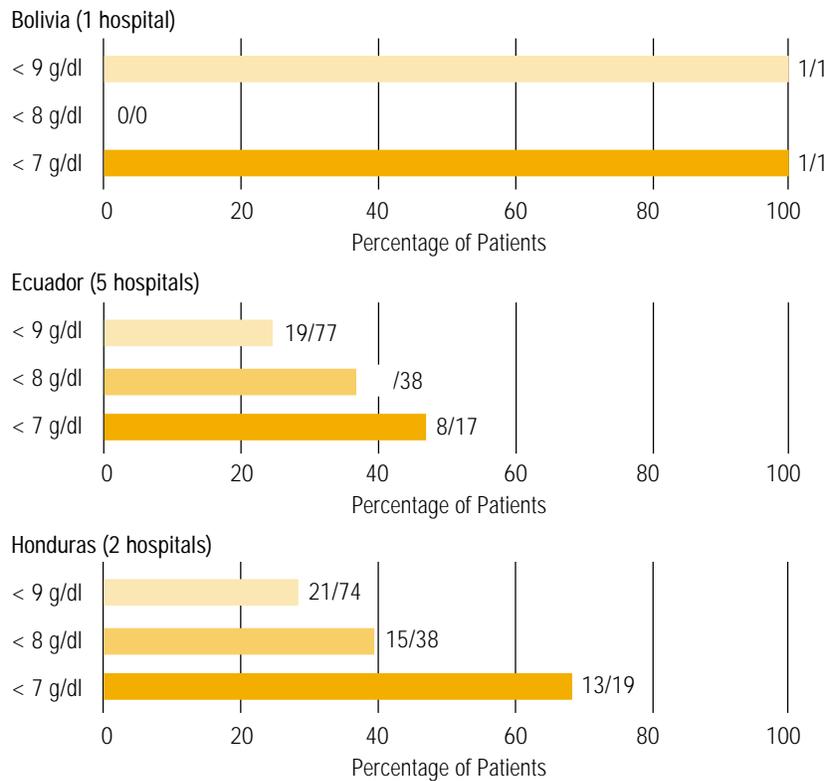
Although only two instances of low hemoglobin were detected in Bolivia, making it difficult to draw conclusions, it may be noted that both cases did receive a blood transfusion. In Ecuador and Honduras, the assessments found that the frequency of blood transfusion increased as the hemoglobin level decreased.

Figure 8  
Cesarean Sections as a Proportion of Deliveries



Indicator 18: All study facilities that perform cesarean sections, 1997

Figure 9  
Obstetric Patients with Low Hemoglobin Who Received Blood Transfusions



Indicator 19: Selected study facilities, 1997

The last two indicators (shown in Tables 17 and 18) examine fetal outcomes in the study facilities. Indicator 20 shows the percentage of obstetric admissions with fetal death recorded in the admitting diagnosis. Indicator 21 measures the percentage of deliveries in the study hospitals that resulted in fetal death, where the mother had been admitted with a live fetus. Indicator 20 perhaps reflects more the accessibility rather than quality of EOC in the study facilities. The fact that values for Indicator 21 are higher than those for Indicator 20 in all three countries raises questions as to whether this phenomenon is the result of delay in seeking care, access to it, or problems within the facilities themselves.

## V. Conclusions

### A. Problem Areas Identified in the Essential Obstetric Care System

#### 1. Accessibility and Coverage of EOC Services

The baseline assessments found that adequate infrastructure to provide essential obstetric care exists in all three study areas. The results for Indicator 1 in all three countries well exceed the standards proposed by WHO in terms of ratio of population per EOC facility. However, the assessments also documented deficits in the capacity of these facilities to deliver quality EOC services. Inadequate supplies and equipment, lack of trained personnel, and failure to comply with quality standards all limit the functional access to EOC services in the study facilities.

Table 17  
Obstetric Patients Admitted with Fetal Death

	Bolivia	Ecuador	Honduras
Number of obstetric patients admitted with fetal death	8	22	45
Total number of obstetric admissions	450	1427	945
Percentage of obstetric admissions with fetal death	1.8	1.5	4.8

Indicator 20: All study facilities, 1997

Table 18  
Deliveries Resulting in Fetal Death

	Bolivia	Ecuador	Honduras
Number of deliveries resulting in fetal death among obstetric patients admitted with live fetus	16	52	95
Total number of obstetric admissions with live fetus	442	1405	900
Percentage of deliveries resulting in fetal death	3.6	3.7	10.5

Indicator 21: All study facilities, 1997

Results of Indicators 3, 6, 7, and 8 suggest that low utilization of the study facilities by the target population is an important barrier to the delivery of EOC services in all three countries. In particular, the referral facilities studied in Bolivia and Ecuador seem to be capturing only a small proportion of expected obstetrical complications, based on national statistics and population. With improved EOC service quality and referral systems, an increase would be expected in the proportion of births with obstetrical complications treated at the referral hospitals. It should be noted that while Indicator 6 found that the number of cesarean sections performed in the study hospitals appeared low as a proportion of expected births, Indicator 18 showed that the proportion of total obstetric admis-

sions in the study hospitals that resulted in cesarean sections fell within the expected range in all three countries.

#### 2. Supplies and Equipment

The baseline assessments included two direct measures of supply and equipment availability (Indicators 10 and 11). Both exhibited wide variation between facilities and between countries. With respect to oxytocin, most of the facilities studied showed an uninterrupted supply or at most lacked the drug for two months or less during a year. However, each country had one facility where oxytocin was never or only infrequently available, suggesting management problems at the district or facility level rather than pervasive scarcity. With regard to availability of critical equipment to

provide the full complement of EOC, 80.0 percent of the study facilities studied in Ecuador possessed the minimum required equipment, 75.0 percent of those in Bolivia did, and 66.7 percent in Honduras did. This finding underscores the need to fully utilize the physical infrastructure available by ensuring that critical equipment needed to provide EOC services is indeed available in each referral facility.

Indicator 19 provides an indirect measure of the availability of critical supplies and equipment; it examined the proportion of obstetric patients with varying levels of low hemoglobin who received blood transfusions. The trend in both Ecuador and Honduras (only two patients had low hemoglobin levels in Bolivia, so a trend is not apparent) was that the likelihood that a patient would receive a transfusion increased at lower hemoglobin levels. Nevertheless, the fact that over half of the patients in Ecuador with hemoglobin levels below 7 g/dl and nearly a third of them in Honduras did not receive transfusions suggests that the availability of blood supplies may be a more limiting factor than awareness of proper case management.

### 3. Compliance with Standards

Several of the indicators used in the baseline assessments dealt directly with compliance with specific EOC tasks, or with aspects related to the facilities' ability to comply with standards through physical presence of written standards or training of personnel in EOC standards. Indicator 2 found wide variation in the availability of written EOC standards, ranging from 25.0 percent of Bolivian facilities to 80.0

percent of Ecuadorian facilities. Indicator 9 found that a large proportion of facility staff had not received any training in the management of obstetrical emergencies, ranging from 60.0 percent of the staff surveyed in Bolivia to 25.8 percent in Ecuador.

Three other indicators examined clinical task performance in EOC. Indicator 13 showed that time intervals between recordings of fetal heart rate far exceeded the 30 minutes recommended by international standards, with country averages ranging from 1 hour 35 minutes in Ecuador to 5 hours 7 minutes in Honduras. With respect to the practice of asepsis during deliveries, Indicator 14 found that the preparation of patients' skin with antiseptic (country averages ranged from 83.3 percent of observed deliveries in Bolivia to 100 percent in Ecuador) and the use of sterile gloves (practiced at a rate of 69.2 percent of observed deliveries in Honduras to 98.1 percent in Ecuador) were the prevailing practice in the cases observed in all three countries. With respect to hand washing, personnel washed their hands in most cases observed in Bolivia, but prevalence dropped substantially in Ecuador and Honduras to only 23.1 percent of observed deliveries in each country.

Indicator 15 found wide variation between countries in the application and recording of hemoglobin tests to patients whose admitting diagnosis suggested the possibility of hemorrhage. In Honduras, 91.7 percent of admissions with possible hemorrhage received a hemoglobin test, while in Ecuador the hemoglobin test was administered in only 71.6

percent of cases. In stark contrast, none of the 19 cases with possible hemorrhage examined in Bolivia received a hemoglobin test.

Two other indicators signaled outcomes of the EOC system in terms of the proportion of deliveries that resulted in fetal death. Indicator 20 found that the ratio of obstetric cases admitted with fetal death to total admissions ranged from 1.5 percent in the Ecuadorian hospitals to 4.8 percent in the Honduran hospitals. Indicator 21 examined the ratio of deliveries that resulted in fetal death to total obstetric admissions with a live fetus. The average ratio for hospitals studied in Bolivia was 3.6 percent; for hospitals in Ecuador, 3.7 percent; and for hospitals studied in Honduras, 10.5 percent. In all three, the values for Indicator 21 were higher than those for Indicator 20. It is not clear whether these results indicate a problem with fetal complications due to delayed arrival at the hospital or deficiencies in hospital care. The high values for Honduras are of particular concern.

These results indicate obstacles to the delivery of quality EOC services. The variation between and within countries suggests that several interventions—including effectively disseminating and communicating standards, in-service training, and job aids; increased supervision and monitoring; and assuring availability of supplies and equipment through process design and quality improvement—will be required to increase awareness of and compliance with performance standards.

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#### 4. Referral System

Two indicators examined the use of referrals. Indicator 4 showed that only a small proportion of obstetric admissions had been referred from another healthcare facility or provider (an average of 5.3 percent of cases examined in Bolivia to 8.6 percent of cases in Honduras). On a positive note, when referrals were made, they tended to be written (ranging from 55.5 percent of referrals in Bolivia to 79.3 percent in Ecuador). Concerns suggested by other indicators relating to coverage of services and birth outcomes may relate to the low level of referrals and to the absence of a real healthcare services network.

#### 5. Monitoring

While the baseline assessments did not explicitly examine whether and how the study districts and facilities monitored quality of care, several indicators do provide some sense of whether monitoring is occurring with respect to the quality of obstetric care. Indicator 12 (recording labor monitoring events) found wide variation between facilities, ranging from 0 to 74.5 percent. Indicator 16 (recording tasks in the management of eclampsia/pre-eclampsia) found a very low prevalence of record keeping (averaging 4.3 to 14.0 percent of cases in each country). Although it is not known whether these tasks were actually not being performed or were simply not recorded, the findings suggest that at best low priority is given to documentation of care and at worst the tasks are rarely done.

Indicator 17 showed that maternal death is not being followed up in the form of either a verbal autopsy or audit. Though only a few maternal

deaths were captured in the baseline assessments, it is notable that none had a verbal autopsy or audit performed by public sector healthcare authorities.

#### *B. Issues for Repeat Facility Assessments*

As discussed in the Introduction, the baseline facility assessments were followed by a series of quality assurance activities to strengthen the delivery of quality EOC. QAP is providing technical support for quality redesign of key processes in EOC to address the needs and requirements of internal and external users, adoption and communication of EOC standards at national and local levels, and the development of quality monitoring systems based on the indicators of the baseline assessment. The LAMM initiative contemplates repeating the facility EOC quality assessments in 2001 to evaluate the effectiveness of these efforts to improve the quality and accessibility of EOC in the study areas.

Furthermore, the replacement of SACOA with Centro de Promoción Agropecuaria Campesina (CEPAC) as the local contractor in Bolivia has resulted in a shift in the intervention area from the Chiquitania Norte District to the Ichilo District (also in Santa Cruz Department). A new facility assessment will be performed in Ichilo to establish the baseline in that area.

To meet the immediate need in Bolivia and the eventual need for a LAMM final evaluation, the baseline assessment indicators and methodology should be reviewed now to ensure that they indeed meet the

initiative's needs for information that reliably measures what has been achieved in improving the quality of EOC. This would include reviewing the adequacy of the indicators, as well as reviewing the data collection instruments and sampling approaches.

The first issue is to determine whether all of the indicators can truly measure improvements in EOC quality that would result from the interventions being supported under LAMM. Some of the indicators (such as those relating to cesarean sections and maternal deaths) may be hard to use as gauges of progress. For example, the baseline assessments suggest that a large proportion of women who die from obstetric emergencies are not reaching the facilities equipped to handle emergency situations. Increases in the number of maternal deaths attended in referral hospitals may actually be desirable if they result from an increase in the proportion of obstetric emergencies that reach these facilities. Some of the original indicators may now be recognized as less useful for impact evaluation purposes. At the same time, there may be new indicators that should be introduced to capture aspects of the EOC system in which improvement is anticipated, but which were not included in the baseline assessments.

Another argument for carefully reviewing the original indicators to verify their continued usefulness is that collecting, processing, and analyzing data on all 21 required significant effort. The facility assessment process might be streamlined by paring down the indicators to a smaller, more manageable set that

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would be easier to collect and faster to analyze. At the LAMM Annual Technical Meeting in Tegucigalpa in October 1999, a proposal was made for institutionalizing an EOC monitoring system based largely on data that are already routinely collected through existing information systems. A set of nine indicators was proposed for this purpose, including five that were used in the baseline assessments (baseline indicators 1, 3, 7, 8, and 21). The four new indicators measure the proportion of obstetric patients discharged with complications and a referral document, the proportion of obstetric patients discharged with complications, the proportion of deliveries

assisted by trained personnel, and the proportion of pregnant women who received at least one prenatal consultation. Consideration should be given to focusing the final facility assessments on this smaller, revised set of indicators.

A related issue is the precise definition used for EOC capacity. The baseline assessments used the WHO/UNICEF/UNFPA criteria to determine whether a facility had the capacity to provide either basic or complete EOC. A slightly different and more stringent definition, emphasizing the continuous availability of care (i.e., 24 hours a day), has been used in the yearly rapid assessments that the LAMM teams

in the three countries have carried out to track USAID's IR 2.4. Consideration should be given to incorporating continuous availability of care in Indicator 1 in the final facility assessments.

Finally, with regard to data collection strategies, since the three baseline assessments adopted different sampling strategies with respect to observation of deliveries and review of medical records, a decision should be made as to which strategies are most appropriate for meeting assessment objectives (for example, multiple observations in one facility or fewer observations in more facilities).

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