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QUALITY OF OBSTETRIC CARE OBSERVED IN 14 HOSPITALS IN BENIN, ECUADOR, JAMAICA, AND RWANDA

QUALITY ASSURANCE PROJECT

OPERATIONS RESEARCH RESULTS

MARCH 2006

This publication was produced for review by the United States Agency for International Development. It was prepared by Bart Burkhalter, Wendy Edson, Steven Harvey, Maina Boucar, Sabou Djibrina, Jorge Hermida, Patricio Ayabaca, Maurice Bucagu, Sourou Gbangbade, and Affette McCaw-Binns.

QA

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ABSTRACT

Trained clinical observers used a structured checklist at referral and district/regional hospitals in four developing countries to monitor care provided to 245 women during labor, delivery, and postpartum and their newborns during postpartum. The countries were Benin, Ecuador, Jamaica, and Rwanda. Observation periods were either continuous and lasted 72 hours or noncontinuous and lasted 12 hours over 4–6 days; all such periods included a weekend day and night. Observers marked the checklist to record the times when healthcare providers performed certain tasks and whether each had been done according to standard. Certain circumstances—such as a woman giving birth before arrival—required rigorous data cleaning.

The quality of care for the different tasks is reported here by country, by hospital type, and overall. The frequency of labor monitoring was well below the rates recommended in all four countries, regardless of hospital type. Fetal heart rate (FHR) was monitored the most frequently at 1.3 times per hour, although its recommended rate in all countries is twice an hour. Other labor indicators recommended at twice per hour were checked less often: maternal pulse was taken 0.43 times per hour, contraction intervals 0.38 times per hour, and contraction duration 0.37 times per hour. The two indicators recommended at the rate of once every four hours (0.25 times per hour) were performed more frequently: maternal blood pressure at 0.63 times per hour and vaginal exam at 1.1 times per hour. On average, in 26% of the cases, no labor indicator was monitored at all.

In the three study countries where partograph use is recommended, incorrect use was observed in more than half the case observations, varying substantially by country. Correct partograph use was associated with more frequent labor monitoring.

Performance on 17 recommended intrapartum tasks varied substantially by task and country, but generally not by hospital type. Many tasks were performed to standard in over 80%—and even 90%—of the cases, but a few were performed to standard infrequently: suctioning the newborn (22%), putting newborn skin-to-skin with mother (29%), and washing hands (33%).

Frequencies of tasks during both mother and baby postpartum care were also low and varied widely by country, averaging once every two hours or longer in three countries and just over once per hour in the fourth, all far below the recommended standard of four or more times per hour. Performance of yes-no (as opposed to frequency) postpartum tasks also varied widely by country. For instance, the percentage of cases where the mother's temperature was taken at least once postpartum varied from 0% to 82%, depending on the country.

There was low correlation between performance during labor and performance in the other three phases (intrapartum, mother postpartum, and baby postpartum), but a moderate correlation between combinations of the last three phases (about 0.50). That is, higher performance in the intrapartum, mother postpartum, and baby postpartum phases was associated with higher performance in each of the other two phases.

Since the observers did not record circumstances that may foster or impede better maternal and newborn care, it would be inappropriate for this study to draw conclusions about the causes of better or worse performance. We do however extract lessons that could inform subsequent studies seeking data for quality improvement during the four phases of birth.

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CONTENTS

TABLES AND FIGURES

ABBREVIATIONS

ANOVA	Analysis of Variance
CEOC	Comprehensive Essential Obstetric Care
FHR	Fetal heart rate
HIV	Human Immunodeficiency Virus
PP	Postpartum
PROSAF	Benin Integrated Family Health Program
QAP	Quality Assurance Project
SPSS	Statistical Package for Social Sciences®
USAID	U.S. Agency for International Development
WHO	World Health Organization

I. INTRODUCTION

Previous studies have shown that quality maternal care in hospitals reduces maternal deaths and disabilities (Miller et al. 1994; WHO 1994). While international standards for obstetric care have been published and widely disseminated (WHO 2000; Kinzie and Gomez 2004), only a few reports (described below) exist on hospital adherence to these standards. Such information is useful because it identifies critical functions that are not performed and could inform quality improvement efforts.

This paper reports adherence to 38 international obstetric standards based on observations of 245 births in 14 hospitals in Benin, Ecuador, Jamaica, and Rwanda. The work is part of a larger Quality Assurance Project (QAP) study that assessed the competence of skilled birth attendants in hospitals, hospital delays in treating obstetric emergencies, and other factors thought to influence the quality of obstetric care in hospitals. The larger study was designed and data collected from September 2001 to July 2002. QAP published individual country reports in 2003 and 2004 (Ayabaca, et al. 2004; Boucar et al. 2004; Gbangbade et al. 2003; McCaw-Binns et al. 2004); more recent papers are on skilled birth attendant competence (Harvey et al. 2004) and on in-hospital delays (Edson et al. 2006).

Published reports on the quality of in-hospital obstetric care in developing countries indicate that performance is often poor compared to international standards:

- Adeyi and Morrow (1997) observed performance of 17 critical obstetric care tasks for 360 deliveries in Nigerian hospitals. They found that, on average, 61% of the tasks were performed to standard, although performance varied widely by task. Their other findings, by task, are in Table A-1 (tables indicated with an "A" are in Appendix A).
- A baseline study for a hospital-focused quality assurance program measured 21 indicators of the structure, process, and outcome of obstetric care in three Latin American countries (Marquez 2001). Specifically, it measured five process indicators of the quality of care: two based on patient record review and three on direct observation of 77 births. Quality scores for the indicators are in Table A-2.
- To evaluate a quality assurance program, Hermida and Robalino (2002) reviewed patient charts to measure labor-monitoring performance, correct partograph use, and other quality indicators in eight Ecuador hospitals. Only 17.7% of the women in labor in four control hospitals over a 15-month period had their fetal heart rate (FHR), maternal blood pressure, and uterine activity checked every hour, and only 5.4% had correctly graphed partographs. The four hospitals with a quality assurance program had much higher rates, achieving 82% for labor monitoring and 75% for partograph use after 15 months.
- Based on observation of 55 women in labor, 21 women having vaginal deliveries, and interviews and/or observation of 88 providers in hospitals in the Dominican Republic, Miller et al. (2003) developed composite assessments of the degree of adherence to 30 critical obstetric standards, 24 of which were similar to some used in the present study. Twelve of those 24 standards were never followed, eight were sometimes followed, and four were always followed. Table A-3 lists the 24 standards and the degree of adherence Miller et al. found.

II. METHODOLOGY

A. PHASES AND STANDARDS OF CARE

We observed the management of labor, delivery of normal births, and postpartum care in hospitals and used a structured checklist based on international obstetric care standards to record adherence to each standard. Observation was planned to begin when the woman arrived at the hospital and end

approximately two hours after the placenta was delivered or when the woman left the hospital, whichever came first. We divided the observation period into four "phases": labor, intrapartum, mother postpartum (PP), and newborn postpartum.[1] For practical reasons, we defined the four phases by the tasks assigned to each, but below we describe the general start and end points of each phase. The tasks appear by phase in the data collection instrument, which is in Appendix B.

Labor phase: The labor phase started when the woman arrived at the hospital and lasted until dilation was about 10 cm., when the pushing sensation begins. Some women were already in labor when they arrived at the hospital; others were not yet in labor but began labor after arrival; and some went home without entering labor. In many cases this phase was determined to have ended when the woman moved from the labor area to the delivery room.

Intrapartum phase: This phase began when the labor phase ended (dilation about 10 cm.) and ended when the placenta delivered.

Mother PP phase: This phase included the two hours immediately following the delivery of the placenta, but the observation time was often either shorter than two hours (especially when the mother left the observation area early) or longer than two hours.

Newborn PP phase: Same as the mother PP phase.

The World Health Organization (WHO 2000) served as the source for quality standards, which were of two types: "monitoring" and "yes-no." Monitoring standards stipulate the frequency that an indicator should be checked during a certain period (e.g., times per hour). Yes-no (or "dichotomous") standards state that a particular task should be performed. We referred to two sources in analyzing the data: WHO (2000) and Kinzie et al. (2004). Table A-4 lists the standards we used and their characteristics.

B. STUDY SITES

Countries were selected to represent both Africa and Latin America and on the basis of locations with QAP field offices. Study hospitals were selected purposively according to the following criteria:

1. A range of levels of care (See Table 1):
   - One large urban referral (tertiary care) hospital with an active maternity department that manages a large number of maternal complications;
   - One or two mid-sized (secondary care, regional) hospitals, and/or
   - One smaller district hospital.
2. An average of at least two births per day (sufficient to permit observation of at least five cases over a two- to three-day period);
3. One or more facilities located outside the capital city but geographically close enough to be manageable within the time and budget available; and
4. Facilities where QAP was conducting program activities, if possible.

[1] The four phases of birth used in this study approximately correspond with the stages of labor generally in use. Kinzie et al. (2004) define "stages" and "phases" of labor as first stage, latent phase: dilation 1–3 cm. and irregular contractions under 20 seconds' duration; first stage, active phase: dilation 4–10 cm. and regular contractions over 20 seconds' duration; second stage, early pushing phase: dilation over 10 cm.; second stage, late expulsive phase: fetus descends to pelvic floor triggering bearing-down reflex; third stage: from birth of baby to delivery of placenta; and fourth stage: first two hours after childbirth.

An in-country study coordinator visited all sites before beginning data collection. He/she briefed the facility director on the study and received permission to conduct the study in that facility. He/she also contacted the maternity department to arrange the observations and assessed the hospital for qualification as Comprehensive Essential Obstetric Care (CEOC) facilities based on the criteria proposed by Maine et al. (1997).

Table 1. Number of Study Sites by Type and Country

Country	Referral Hospitals	Regional or District Hospitals	Total
Benin	2	2	4
Ecuador	1	2	3
Jamaica	2	2	4
Rwanda	1	2	3
Total	6	8	14

C. STUDY PERSONNEL

The activities of QAP's larger study in each country were under the direction of a resident country coordinator and included choosing sites, gaining approvals, hiring and training data collectors and other local staff, and carrying out data collection. The data collection teams that observed births and completed data collection forms included obstetricians/gynecologists, pediatricians, midwives, and nurses. All observers were either retired or practicing in a facility other than the ones where they collected data.

D. STUDY TIMELINE AND DATA COLLECTION INSTRUMENT

We implemented the study over an 18-month period: September 2001–February 2003. After a review of the literature and written protocols, an expert group of maternity health experts meeting in Bethesda, Maryland, in October 2001 reviewed the study protocol and discussed key methodological issues. We pilot tested a draft study instrument in Spanish in Ecuador during November and December 2001; it was extensively revised and then translated into English and French by February 2002. The study team and data collectors in each country reviewed it for applicability to each country's healthcare setting. A generic, English version is in Appendix B. Data were collected from February through July 2002: in Ecuador in February, in Rwanda and Benin in March, and in Jamaica in June and July. Early results were presented in October 2002 and country reports written in 2003.

E. DATA COLLECTION PROCEDURES

Study personnel trained data collectors during one-day sessions in each country. Training included the rationale for the study, its applicability to the QAP country program if any, Ministry of Health objectives, and how the results would be used to improve care. The data collection instrument was reviewed and the intent of each item clarified. In some cases, data collectors suggested useful changes in the wording or form of the questions. All data collectors were told that if during their observation they were concerned with the care or well-being of a patient, either mother or newborn, they should cease observing and intervene as they would normally do in their practice.

In Rwanda and Jamaica, observers spent three consecutive 24-hour days, including a weekend day, at each facility. In Benin and Ecuador they had nonconsecutive 12-hour shifts, including days, evenings, nights, and at least one weekend day and night at each facility. Larger teams were generally used for large reference hospitals and smaller ones for district hospitals. An observer with clinical experience was often chosen as team leader.

F. RESEARCH ETHICS

All protocols were reviewed according to established QAP policy and procedures. Approvals were obtained from the four Ministries of Health and all hospitals before data collection began. Study data were kept confidential in file cabinets in QAP's Bethesda office. Observers were told that if during their observation they were concerned with the care or well-being of a patient, they should cease observing and intervene.

G. DATA ANALYSIS

Data were keyed into either a Microsoft Access® or Statistical Package for the Social Sciences® (SPSS) database, and analysis was conducted using SPSS version 9.0 and Microsoft Excel®. Extensive data cleaning was conducted as described in the next section.

III. CRITERIA FOR EXCLUDING DATA AND DATA CLEANING

All data were obtained from the direct observation of births as recorded on "Performance in Managing the 3 Stages of Normal Labor and Delivery" (Appendix B); data are of two types: (1) yes-no (dichotomous) variables, such as "Was oxytocin given?", and (2) monitoring variables.

Yes-no variables applied in all four phases, and the form has boxes for three possible responses: "Yes," "No," and "Not observed." No observer ever indicated more than one response. Where observers gave no response to a dichotomous variable, we assigned the response of "Missing," creating a fourth possible "response." We entered one of these responses into the database for each dichotomous variable. We describe how we addressed missing data below.

We measured monitoring variables (e.g., FHR, maternal blood pressure) for three phases: labor, mother PP, and newborn PP. The observer recorded each instance when a provider monitored a particular indicator and noted the time that such monitoring occurred. Unlike the dichotomous variables, no explicit recognition was made for "Not monitored" or "Not observed." After an observer completed a case observation, a data collection supervisor wrote on the same form the number of times a particular monitoring variable was monitored. That number was entered into the database along with the start and end times of each phase. We calculated two types of variables from these data: (1) the frequency (times per hour) of monitoring (e.g., the number of times the maternal blood pressure was monitored during labor divided by the length of the labor observation period) and (2) whether or not the variable was monitored at least once. The "monitored at least once" variable is also dichotomous.

Defining performance for yes-no variables: Performance of these variables was defined as those that were coded "Yes"; responses marked "Missing" were defined as "No." Thus, the performance of a variable equaled the number of "Yes" responses divided by the sum of the number of "Yes," "No," and "Missing" responses. "Not observed" cases were excluded from both the numerator and denominator.

"Not observed": A particular variable for a case could be judged as "Not observed" under four circumstances:

1. Special conditions: Certain conditions precluded observation of at least some tasks: born before arrival, not delivered during observation period (including not in labor), C-section, twins, stillbirth, HIV-positive mother, and observer assisted with care. Table 2 provides the decision rules for excluding variables (i.e., assigning them "Not observed") for these conditions. The data form did not include specific questions about some of these conditions, but some conditions could often be discerned from written notes and other information on the form (see Items B13, C16, and D6 on the form).

2. No data recorded for entire phase: If there were no checkmarks on the form for an entire phase (except "Not observed" check marks) and no notes were written on the form indicating that it had been observed, the entire phase was assigned "Not observed" status and excluded from the analysis. Special conditions caused most of these occurrances.

3. Variable checked "Not observed": When a variable was recorded as "Not observed," it was excluded from the analysis.

4. Start or end time not recorded: When either the start or end time of the labor period was not recorded (Items B1 and B3) or could not otherwise be estimated, then the duration of observed labor was unknown and the frequency of the labor-monitoring variables could not be calculated. In a few cases other information on the form allowed us to estimate the missing time. Similarly, if the start of the postpartum period was not recorded (delivery of placenta: Item C10.3), then the duration of the postpartum phases could not be calculated directly. However, in many cases where the time of placenta delivery was not recorded, the time of birth was. In these cases, we estimated the time of placenta delivery by adding the mean time between the delivery of the baby and the placenta for that country to the birth time for the case. [2] Postpartum-monitoring frequencies were calculated using this duration.

Table 2. Rules for Assigning "Not Observed" for Special Conditions

Special Condition	Phases			
	Labor	Intrapartum	Mother Postpartum	Baby Postpartum
Born before arrival	Exclude all[1]	Exclude all	Include	Include
Not in labor nor delivered[2]	Exclude all	Exclude all	Exclude all	Exclude all
Not delivered[2]	Include	Exclude all	Exclude all	Exclude all
C-section	Include	Exclude all	Include	Include
Twins[3]	Include	Include Items C2–C8[3]	Include Item D4[3]	Include Items E1–E8[3]
Stillbirth[3]	Include	Exclude Items C3, C5–C8, and C15[3]	Exclude Item D4[3]	Exclude all
PP observation <1 or >3 hours	Include	Include	Exclude all	Exclude all
Mother HIV-positive[3]	Include	Include	Exclude item D4[3]	Exclude item E6[3]
Observer assisted care	]----------Exclude variables where observer assisted----------[			

Notes: 1. "Exclude all" means that all variables in that phase are assigned "Not observed" status. 2. All undelivered cases during the observation period are assigned "Not delivered" unless a written note on the data collection form specifically indicates "Not in labor," in which case they are assigned "Not in labor nor delivered." 3. Item numbers refer to tasks in the data collection form (Appendix B).

Differences in "Not observed" among the four countries: Table 3 shows the number cases with different types of special conditions or entire phases excluded from the analysis because they lack data other than "Not observed." It indicates that the number of special conditions differed substantially among countries, with Jamaica having many and Ecuador none. In Ecuador, where the pilot test and first data collection were done, cases with special conditions were excluded and consequently not recorded on the form. These data indicate that the rules on which cases to exclude from observation because of special conditions were probably not applied uniformly.

[2] The mean period from the birth of the baby to the delivery of the placenta was small, averaging 10.2 minutes (n = 147) overall; Benin = 11 minutes, Ecuador = 10 minutes, Jamaica = 8 minutes, and Rwanda = 13 minutes.

Table 3. Special Conditions and Missing Phases, by Country

Special condition or missing entire phase	Benin	Ecuador	Jamaica	Rwanda	Total
Number of cases, including "Not observed"	41	41	103	60	245
Special condition[1]					
1. Born before arrival	0	0	2	0	2
2. Not in labor nor delivered	0	0	19	1	20
3. Not delivered	0	0	16	1	17
4. C-section	5	0	12	9	26
5. Twins	1	0	2	0	3
6. Stillbirth	3	0	4	1	8
7. Mother HIV-positive	1	0	5	0	6
Entire phase blank[2]					
8. Labor	0	4	3	1	8
9. Intrapartum	0	0	0	0	0
10. Mother PP	0	0	4	4	8
11. Newborn PP	2	0	8	2	12
PP observation < 1 or > 3 hours[3]					
12. Mother PP phase	2	0	4	5	11
13. Baby PP phase	2	0	3	6	11

Notes: 1. We excluded the labor phase when special conditions 1 or 2 apply; the intrapartum phase when conditions 1, 2, 3, or 4 apply; the mother PP phase when conditions 2 or 3 apply; and the baby PP phase when conditions 2, 3, or 6 apply. 2. The number of cases where a special condition does not already exclude the entire phase is in question. 3. The number of cases where a special condition does not already exclude the entire phase is in question or where the entire phase is not already blank.

Since the Government of Jamaica does not require use of the partograph and it was not often used there, the two partograph tasks (Items B12.1 and B12.2) were excluded from the Jamaica analysis. Some other observed tasks were not standard practice in a country or in some facilities (such as giving oxytocin to all women after delivery in Ecuador, suctioning the newborn, and putting the baby in skin-to-skin contact with the mother) but were included in the analysis and noted.

IV. RESULTS

A. NUMBER OF OBSERVED CASES

The sample size for each task-associated variable is what remains after excluding entire phases and items for the reasons summarized in Table 3 and tasks "Not observed." An approximate sample size for each phase, aggregated by country and by hospital type, is in Table 4. Its figures overestimate the actual sample sizes for each variable because they account only for the exclusions noted in Table 3 and not for "Not observed." tasks. Sample sizes for specific tasks are in Tables A-5–A-12b.

Table 4. Number of Cases by Phase, Country, Hospital Type, and Overall

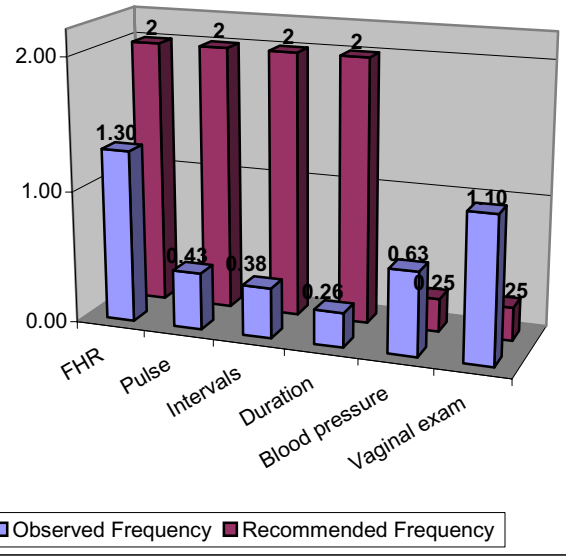
Phase	Country				Hospital Type		Overall
	Benin	Ecuador	Jamaica	Rwanda	Referral	Distr/Reg	
Labor	41	37	79	58	120	95	215
Intrapartum	36	41	54	49	93	88	181
Mother PP	34	41	59	48	96	86	182
Baby PP	34	41	53	49	90	87	177
All phases	41	41	103	60	137	108	245

Note: This table includes cases for which individual indicators or entire phases were judged "Not observed" as explained in the text, thus overstating the actual sample sizes used in the analysis.

B. LABOR PHASE

Of all indicators observed during labor, fetal heart rate (FHR) was monitored the most frequently, an average of 1.3 times per hour (Figure 1). The figure shows that this rate is well below the recommended standard of twice an hour, but the observed frequency rates of the other indicators with a recommended frequency of twice an hour (maternal pulse, contraction interval, contraction duration) were even farther below the recommended rate. On the other hand, the two indicators recommended for monitoring only once every four hours (maternal blood pressure and vaginal exam) were monitored much more frequently than the other indicators (except FHR). Every country produced this result (Table A-5).

Figure 1. Labor Monitoring: All Cases Pooled
Average Times Checked per Hour



Some labor indicators were never monitored, although this was rarely true for FHR or vaginal exams, which were monitored at least once in over 90% of the cases. Overall, maternal pulse and contractions were never checked in 40% and 50% of the cases, respectively. Maternal pulse was never checked in 63% of the Benin cases and 69% of Rwanda's. Intervals between contractions were never measured in 75% of the Benin cases. When all six labor indicators are pooled over all cases, 28.6% were never checked (Table A-6). The differences in performance between countries is just significant ($p < 0.05$), but not between hospital types.

Table 5 shows that, overall but excluding Jamaica because its MOH does not require or recommend partograph use, the two partograph tasks are performed to standard about 40–50% of the time. In most cases, either both partograph tasks were performed to standard or neither was. The differences between countries is highly significant ($p < 0.001$), but not between hospital types.

Table 5. Labor Monitoring with Partograph: Percentage of Cases Performed to Standard, by Country, Hospital Type, and Overall[1]

Partograph Tasks	Country			Hospital Type		Overall
	Benin	Ecuador	Rwanda[2]	Referral	Distr/Reg	
	Percent (x/y)	Percent (x/y)	Percent (x/y)	Percent (x/y)	Percent (x/y)	Percent (x/y)
Alert line	68.3 (28/41)	24.3 (9/37)	50.0 (25/50) *	44.1(26/59)	52.2 (36/69)	48.4 (62/128)
Action line	61.0 (25/41)	18.9 (7/37)	50.0 (25/50) *	40.7(24/59)	47.8 (33/69)	44.5 (57/128)
All cases in both indicators pooled	64.6 (53/82)	21.6 (16/74)	50.0 (50/100)***		50.0 (69/138)	46.5 (119/256)

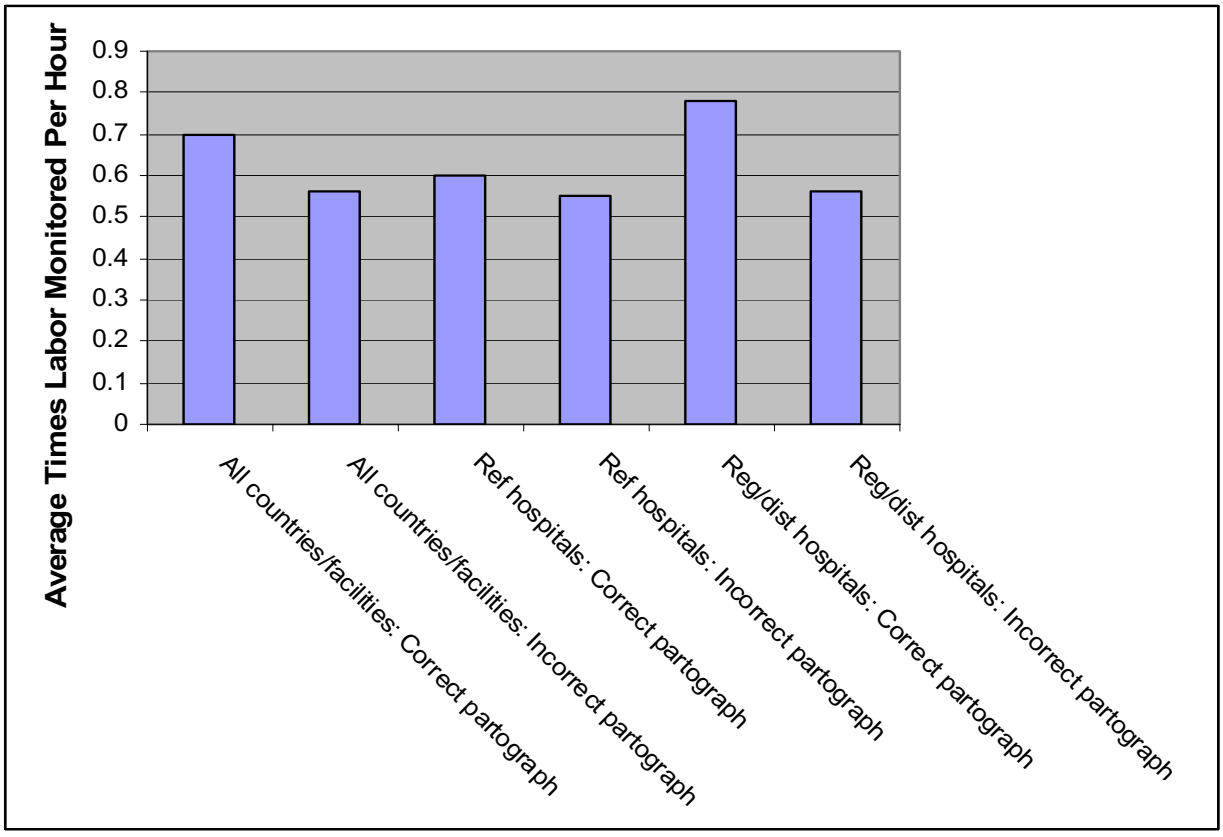
Notes: 1. All calculations are pooled cases. X is the number of cases performed to standard, and y is the number of valid cases (Yes, No, and Missing). We excluded "Not observed" cases. 2. Asterisks indicate significant differences between Rwanda and the other countries at the 0.05 (*) or 0.001 level (***) by the Chi-squared test. Differences between hospital types were analyzed using the Chi-squared (Yates correction) test. All comparisons without asterisks are not significant ($p > 0.05$).

Is correct partograph use associated with better labor monitoring?

We found different results with regard to the association between correct partograph use and better labor monitoring depending on how we performed the analysis.

We found such association when we used average frequency in the calculation (Figure 2): an average of 0.70 times per hour with correct partograph use versus 0.56 without. This pattern holds by country:

Figure 2: Labor-Monitoring Frequency with and without Correct Partograph



0.77 versus 0.60 times per hour in Benin, 0.89 versus 0.67 in Ecuador, and 0.57 versus 0.41 in Rwanda. These differences are significant only in Benin (at the 0.001 level). The association is also true by hospital type: 0.60 versus 0.55 times per hour in referral hospitals and 0.78 versus 0.56 in district/regional hospitals. This difference is significant in the district/regional hospitals (at the 0.05 level). This pattern of increased monitoring frequency with partograph use is also reflected in the individual indicators at the country level, the only exception being the frequency of vaginal exams in Benin and Ecuador, although the differences are not significant (Table A-7).

Interestingly, analyzing the percentage of cases monitored at least once rather than the average frequency generated different results. The at-least-once analysis found only a small association between correct partograph use and whether or not the indicators were checked at least once or not at all. When the partograph was done correctly, an average of 4.18 of the six indicators were checked per case, whereas when the partograph was incorrect, an average of 3.97 indicators were checked at least once. Table A-8 shows that some indicators were more likely to be checked at least once when the partograph was correct (FHR, vaginal exam), some less likely (maternal pulse), and others about the same. Although sample sizes are small and differences not significant, correct partograph did not seem to have a consistent and substantial effect on the percentage of indicators monitored at least once within hospital type or country, except Ecuador, where correct partograph use correlated with a higher percentage monitored at least once.

Over all three countries, the average duration of observed labor was substantially longer in cases with correct partograph use (4.07 hours) than in cases of incorrect partograph use (2.85 hours). This finding met our expectations because it is likely that partograph use is omitted in many short labors.

Although higher monitoring frequency was observed with correct partograph use than with incorrect use, it is strange that a substantial number of cases with correct partograph use had poor monitoring. This may relate to the variety of partograph forms in use in the different countries and the different interpretations that the observers may have given to their instructions. Partograph use may have been judged to be correct if a single indicator was graphed at a few points, even if other key indicators—pulse, blood pressure, and intervals between contractions—were never checked.

Removing cases where the indicator was never monitored from the analysis (leaving only those that were checked at least once) increases the average frequency. Over the three countries, the average monitoring frequency for the indicator monitored at least once increased to 0.90 per hour for cases with correct partograph use and to 0.75 per hour for those with incorrect partograph use. In Rwanda, the average frequency per hour was substantially more with correct partograph use than with incorrect use (0.78 versus 0.53). In Benin and Ecuador, the differences were smaller: 1.02 versus 0.89 and 0.89 versus 0.91, respectively.

C. INTRAPARTUM PHASE

Figure 3 and Table 6 present data on the 17 indicators for intrapartum care (Tables A-9a and A-9b have details). Performance ranges from a low 22% (suction newborn) to a high 97% (use new or sterilized gloves, dry and cover newborn). Two other tasks stand out for low performance: skin-to-skin contact after birth at 29% and wash hands at 33%. Note that many tasks were performed adequately in over 80% and even 90% of the cases observed.

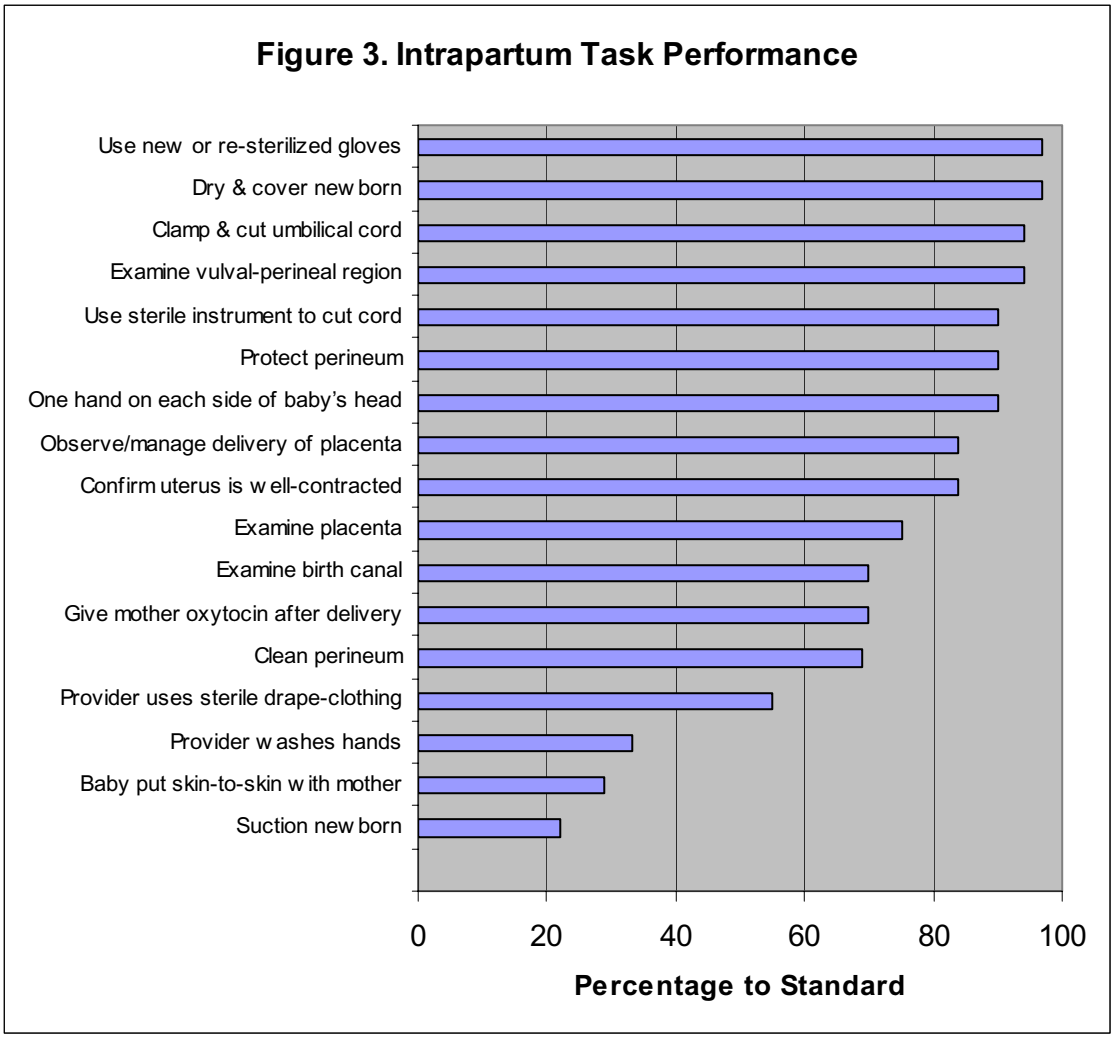


Table 6 shows the percentage of cases performed to standard by country, hospital type, and overall. The average performance across all countries and indicators was about 74%. Performance across the four countries ranged widely: Jamaica had the highest performance across all indicators (81%) and Rwanda the lowest (65%). This overall difference between the countries is highly significant ($p < 0.001$). As expected, performance within indicators varied even more between the countries, but there was very little difference between referral hospitals and district/regional hospitals in the pooled score of all indicators.

Table 6. Performance during Intrapartum Phase: Percentage of Cases Performed to Standard, by Country, Hospital Type, and Overall[1]

Indicator	Country				Hospital Type		Overall
	Benin	Ecuador	Jamaica	Rwanda[2]	Referral	Distr/Reg	
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Use new or re-sterilized gloves	97.2	100	94.5	97.9	94.7	100	97.2
Dry and cover newborn	97.1	100	94.4	97.9	95.6	98.8	97.2
Clamp and cut umbilical cord	86.1	97.6	94.5	97.9	95.7	93.1	94.4
Examine vulval-perineal region	94.4	95.1	96.4	89.4	93.5	94.2	93.9
Use sterile instrument to cut cord	100	100	96.3	100	97.8	100	89.9
Protect perineum	100	87.8	88.7	84.8	92.2	86.9	89.7
One hand on each side of baby's head	100	92.7	86.8	82.6	88.8	90.5	89.6
Observe/ managed delivery of placenta	72.2	100	81.5	83.3	80.4	88.5	84.4
Confirm uterus is well contracted	94.4	80.0	98.2	63.0	84.9	83.3	84.2
Examine placenta	78.8	70.7	96.2	53.1	84.4	65.1	75.0
Examine birth canal	57.1	90.2	98.2	23.3 ***	68.9	70.2	69.5
Give mother oxytocin after delivery	82.4	36.6	85.5	70.2	77.4	60.7	69.5
Clean perineum	41.2	95.1	83.3	48.9 **	65.9	71.8	68.8
Use sterile drapes and clothing	5.6	95.1	34.5	81.3 ***	48.9	61.6	55.0
Wash hands	15.6	31.7	74.5	0.0 ***	36.0	29.4	32.7
Baby put skin-to-skin with mother	61.1	9.8	42.0	8.5 ***	36.4	22.1	29.3
Suction newborn	0.0	36.6	27.5	18.8 **	24.4	19.8	22.1
All cases in all indicators pooled	70.1	77.6	81.1	65.0 ***	74.9	72.7	73.8

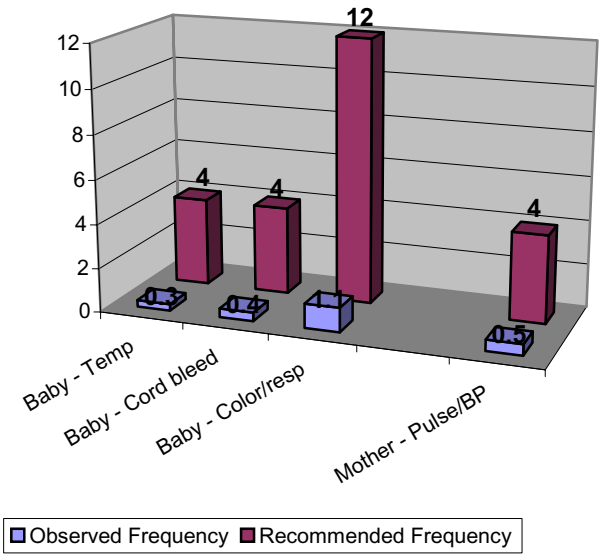
Note. 1 All calculations are pooled cases. Percentages were calculated as the number of cases performed to standard (Yes) divided by the number of valid cases (Yes+No+Missing). Not observed cases are excluded. (See Tables A-9a and A-9b.) 2 Asterisks indicate significant differences between countries at the 0.01 (**) or 0.001 level (***) by the Chi-squared test. The difference between hospital types was analyzed using the Chi-squared (Yates correction) test. All comparisons without asterisks are not significant ($p > 0.05$).

D. MOTHER AND BABY POSTPARTUM PHASES

The indicators of performance during the mother and baby postpartum phases include both monitoring and dichotomous variables. The results for monitoring variables (average frequency per hour, percentage monitored at least once) are in Tables A-10 and A-11; those for dichotomous variables are in Tables 7, A-12a, and A-12b.

Postpartum mother: We measured only one monitoring indicator during the mother PP phase: checking maternal pulse and blood pressure. International guidelines recommend monitoring this combined indicator four times an hour in the immediate PP period, but we found it to be checked on average once every two hours across all cases and at least once in only 57% of cases. It was highest in Jamaica and lowest in Ecuador and Rwanda; referral and district/regional hospitals performed about equally in this indicator (Figure 4 and Tables A-10 and A-11).

Figure 4. Postpartum-Monitoring Frequency for Mother and Baby: Average Times Checked per Hour



Of the four dichotomous variables measured during the mother PP phase, 56% were performed to standard. Across all cases, uterine retraction and external genitalia were checked 70–80% of the time, while breastfeeding was initiated within two hours of birth just over 40% of the time and the mother's temperature was taken only about 30% of the time. Large and statistically significant differences occurred between countries, with Jamaica's performance highest and Rwanda's lowest, but only small, nonsignificant differences were found between referral and district/regional hospitals (Table 7).

Table 7. Performance during Mother and Baby Postpartum Phases: Percentage of Cases Performed to Standard, by Country, Hospital Type, and Overall

Indicator	Country[1]				Hospital Type[1]		Overall[1]
	Benin	Ecuador	Jamaica	Rwanda[2]	Referral	Distr/Reg[2]	
Mother PP phase							
Check uterine retraction	94.1	73.2	93.2	40.9*	71.7	80.2	75.8
Check ext genitalia for hemorrhage	94.1	68.3	93.2	32.6**	72.5	73.3	72.9
Initiate breastfeeding within 2 hours	16.1	70.7	60.4	2.9***	33.3	50.6	41.9
Check temperature	21.2	4.9	82.1	0.0***	38.9	23.8	31.6
All mother PP indicators pooled	57.6	54.3	82.8	19.9***	54.8	57.3	56.0
Baby PP phase							
Antimicrobial eye drops/ointment	100	100	88.0	42.9*	79.8	81.2	80.5
Breastfed on demand	22.6	70.7	65.3	4.1***	30.2	52.4	41.2
Constant supervision	24.2	19.5	82.0	49.0**	63.6	29.4	46.8
Blood and meconium cleaned	82.4	90.2	94.1	73.5	86.5	83.7	85.1
All baby PP indicators pooled	58.3	70.1	82.5	42.3**	65.3	61.8	63.6

Notes: 1. All calculations are pooled cases. Percentage was calculated as the number of cases performed to standard (Yes) divided by the number of valid cases (Yes, No, and Missing). Not observed cases are excluded (see Tables A-12a and b). 2. Asterisks indicate significant differences between countries at the 0.05 level (*), the 0.01 level (**), or the 0.001 level (***) by the Chi-squared test, and differences between hospital types were analyzed using the Chi-squared (Yates correction) test. Comparisons without asterisks are not significant ($p > 0.05$).

Baby postpartum: We measured three monitoring indicators during this phase: color/respiration, the baby's temperature, and cord bleeding. Overall, providers checked these indicators slightly more than once every two hours on average, well below the frequency recommended, but this overall frequency masks large differences between indicators and countries. On average, color/respiration was monitored more than once an hour, while temperature and cord bleeding were checked less than every two hours. In fact, temperature and cord bleeding were never checked in 64% and 51% of the cases, respectively. As with monitoring frequency, the percentage never monitored differed widely among indicators and countries, with Jamaica the highest and Rwanda the lowest (Tables A-10 and A-11).

Of the four dichotomous variables, two (apply antimicrobial drops or ointment in baby's eyes, clean meconium and blood) were performed about 80% of the time, while the other two (breastfed on demand, constant supervision of baby) were performed only 40–50% of the time (Figure 4). Substantial and statistically significant differences between countries are apparent, with Jamaica and Ecuador higher and Benin and Rwanda lower. We found no statistically significant difference by hospital type, although breastfeeding on demand was higher in district hospitals and constant supervision of the baby was higher in referral hospitals (Tables A-12a and A-12b).

E. ASSOCIATION BETWEEN BIRTH PHASES

We found a positive association of performance levels between all birth phases: Cases that received higher quality care in one phase were more likely to receive higher quality care in the other phases. However, the correlation between phases was not very strong. The association of care in the labor phase with each of the other phases was weakest, while the association of the other three phases with each other was somewhat stronger. The Pearson correlation coefficients between labor performance and intrapartum, mother PP, and baby PP are, respectively, only 0.22, 0.14, and 0.26. The correlations of intrapartum performance with the two postpartum phases are somewhat higher: 0.39 and 0.43. The two postpartum phases have the highest correlation at 0.54. Intrapartum performance showed a much higher positive slope when regressed against each postpartum phase (1.10 [mother] and 0.75 [baby]) than the other slopes, which ranged from 0.02 to 0.04 (Table 8).

Table 8. Association of Performance between Pairs of Birth Phases

Earlier Phase (X)	Later Phase (Y)	Correlation Coefficient	Regression Slope (X on Y)	Regression Intercept (X on Y)	Valid N
Labor	Intrapartum	0.22	+ 0.02	0.65	174
Labor	Mother PP	0.14	+ 0.03	0.44	174
Labor	Baby PP	0.26	+ 0.04	0.46	170
Intrapartum	Mother PP	0.43	+ 1.10	– 0.23	168
Intrapartum	Baby PP	0.39	+ 0.75	0.08	164
Mother PP	Baby PP	0.54	+ 0.38	0.40	172

Notes: The performance per case for each phase was: for labor the proportion of valid indicators (out of 6) monitored at least once; for intrapartum the proportion of valid indicators (out of 17) performed to standard; for mother PP the proportion of valid indicators (out of 5) monitored at least once or performed to standard; and for baby PP the proportion of valid indicators (out of 7) monitored at least once or performed to standard.

V. DISCUSSION

This study tried to measure the extent to which the care in 245 normal obstetric deliveries in four developing countries met international standards. We observed care in 14 hospitals from each woman's arrival for delivery until two hours after delivery of the placenta.

Tasks were grouped by phase: labor, intrapartum, mother postpartum, and newborn postpartum. While observed performance was generally below standard, it varied widely by standard, phase, and country: The seven labor-monitoring indicators were checked at least once only 74% of the time, and average labor-monitoring frequency was even lower. Fetal heart rate was the most frequently

monitored labor indicator; checking maternal pulse, contraction interval, and contraction duration were very infrequent.

We are puzzled that observed frequencies were very low for the indicators with a recommended frequency of twice per hour and high for indicators with a recommended frequency of only once every four hours and suggest future analyses. Are the data skewed by factors such as parity and short duration of observed labor? Are vaginal exams substituted when necessary monitoring equipment or supplies are not available for monitoring other indicators? Ultimately, we would like to know what are the most cost-effective and practical means to improve outcomes, but more must be understood before we can attempt an answer.

In theory, correct partograph use should lead to better labor monitoring, and in fact, our data support that theory. Interestingly, Ecuador had the highest association between correct partograph use and average frequency of monitoring, although it had the lowest percentage of cases where the partograph was correctly used. (The significant association between correct partograph use and average frequency of monitoring is simply a correlation and does not show that partograph use caused better monitoring.) The correlation of correct partograph use to monitoring-at-least-once was very small, much smaller than to average frequency. Stated differently, over all indicators and cases, the percentage of times that no monitoring was done was about the same whether or not a partograph was used correctly, but when monitoring was done, average frequency was significantly higher when a partograph was used correctly.

The observed performance scores on the 17 intrapartum indicators varied widely by indicator and country. Nine of the 17 tasks were performed to standard in more than 80% of cases, while three were done less than a third of the time. Performance of some crucial tasks was particularly low in one or two countries but often high in the others. The data may shed light on some causes of low performance; for example, the low score for hand washing may be partially explained, although not justified, by the high percentage of cases where new or re-sterilized gloves were used. These two standards (hand washing and sterile gloves) highlight the larger issue of the interrelationship of some standards: They may be so interrelated as to recommend an investigation into whether one standard would suffice.

Mother and baby postpartum monitoring was poor across all countries: about a tenth the recommended frequency. Of particular concern is that immediate and on-demand breastfeeding was not observed very often in Benin and Rwanda, perhaps due to confusion around proper infant-feeding practices in HIV-endemic areas. Low rates of newborn supervision may be linked to personnel shortages.

In all phases, very little difference was found between the quality of care in referral hospitals and district/regional hospitals.

The relationships between the quality of care in pairs of birth phases met our expectations. First, a positive correlation exists in performance between phases: Cases with higher quality in one phase have higher quality of care in others. Second, the correlation between quality during labor and quality in other phases is low (0.14 to 0.26), somewhat higher between the intrapartum phase and each postpartum phase, and highest between the two postpartum phases (0.54). These correlations may reflect a phenomena where different providers give care during labor than during the other phases, but many of the same providers give care during the last three phases. It seems logical that performance in both postpartum phases would correlate highly since the mother and baby are together and are usually monitored simultaneously. Additional analysis would reveal which factors could explain these correlations.

We compared our results to those previously reported in the literature for the 11 similar tasks in Table A-13, and many but not all of our results were consistent with previous reports. Consistent scores that were relatively high (60–90%) were reported for examining the placenta after delivery, giving oxytocin after delivery, cleaning the perineum with antiseptic, and using new or sterile gloves. Consistently low scores (under 50%) were reported for hand washing and correct partograph use. The

performance of labor monitoring indicators (FHR, pulse, blood pressure, and vaginal exams) varied by study. Due to the paucity of data, conclusions are difficult to draw.

We had several concerns about the definitions of variables and quality of data and addressed them carefully. First, our observations started when the woman entered the obstetric ward, regardless of how far along she was in labor, so labor observations began anytime during the period from pre-labor to well-progressed labor. This unavoidable variation not only decreased the precision of our monitoring-frequency measurements but also created outliers from women who arrived just before birthing: Their very short measured labors had very high monitoring frequencies. We addressed this issue by eliminating data for all women who arrived at the hospital 12 minutes or less before birth.

Although our definition of the postpartum period was the two hours after delivery of the placenta, and data collectors were instructed to obtain data for only that period, many observations covered more or less than two hours. The longer observations may have included more tasks than shorter ones. Here, we limited the problem by excluding all cases where the PP period was either less than one hour or more than three. Average monitoring frequency was calculated as the number of times an indicator was monitored divided by the length of a one- to three-hour labor observation. Additional analysis would uncover factors that are associated with the various PP quality indicators, including the duration of the observed postpartum period.

The data collection and reporting practice differed from country to country. A few tasks of local importance were added to the data collection forms in some places, but not analyzed here. Data collection forms and instructions were prepared and applied in three languages. The partograph tasks are not required by the Government of Jamaica and so were not collected there. Special conditions that excluded some phases from proper observation (such as born-before-arrival, cesarean sections, and stillbirths) were removed from the data in the field in some countries but not in others, resulting in substantially different numbers of such special conditions being reported in the four countries. Thus, the results presented here cannot be used to estimate the proportion of obstetric arrivals at the hospital with these special conditions. In general, the differences among the countries in the procedures for data collection and reporting mean that the individual country results are only approximately comparable, and the differences may be partly explained by the differences in data collection procedures. However, we could not identify compelling reasons why a higher rate of "not observed" data in a country should result in a higher or lower adherence to standards in the country.

Many factors may have influenced the quality of care reported here, and the data from the larger four-country study may shed light on some of influences. However, this report focuses only on the quality of care that was observed in relation to recommended international standards. We intend to address the relationships between potential influencing factors and performance in subsequent reports. The relationships between the quality of care indicators studied here and outcomes are vitally important, but well beyond the scope of this study.

VI. LESSONS

We have identified several lessons for future studies of the quality of obstetric care.

Special Conditions: The data collection form should contain information about the special conditions such as those identified in Table 2. Specific numbered items on the form should be accorded to each special condition, with clear definitions for each special condition.

Not-in-labor: Some women who arrive not-in-labor are sent home, while others remain in the hospital until labor starts. Data collection should identify women who arrive not-in-labor and record whether they went home or stayed until labor started, and the times when they arrived, left, and/or started labor.

Latent versus active phases of first stage of labor: Data on the time when the latent stage of labor ended and the active stage started (dilation of less or more than 4 cm.) should be recorded. If a woman arrives already in the active stage, this should be recorded. The monitoring events should be linked to this information so that monitoring frequencies can be related to the latent and active stages of labor.

Dilation of 10 cm.: The time when the second stage of labor begins (dilation of 10 cm.; pushing sensation) should be recorded on the form.

Monitoring during intrapartum phase: Critical monitoring indicators during the intrapartum phase should be defined, included in the data collection form, and recorded during observation.

Recording times: Careful testing should be done in each country to ensure accurate recording of times for events such as arrival at hospital, birth of baby, delivery of placenta, and end of postpartum observation. A 24-hour clock definition of the hour is most convenient, but may not yield reliable recordings, in which case clear and effective designation of AM and PM is required. Observations that stretch into the next day should be clearly noted on the data collection form with instructions to both data collectors and to individuals cleaning and entering the data.

Observer training: More elaborate training and testing of observers are needed, including manuals.

REFERENCES

Adeyi O and R Morrow R. 1997. "Essential obstetric care: Assessment and determinants of quality." *Soc Sci Med* 45(11):1631–39.

Ayabaca P, SA Harvey SA, WN Edson, B Burkhalter, C Antonakos, J Hermida y P Romero. 2004. Estudios de maternidad segura—resultados del Ecuador: Competencia del personal calificado para la atención al parto; El ambiente viabilizador para la atención calificada al parto; Demoras en el tratamiento de complicaciones obstétricas dentro de los establecimientos de salud (Análisis de la tercera demora). *Resultados de la investigación operativa.* Bethesda, MD: Publicado para USAID por el Proyecto de Garantía de Calidad.[3]

Boucar M, M Bucagu, S Djibrina, W Edson, B Burkhalter, S Harvey, and C Antonakos. 2004. Safe motherhood studies—results from Rwanda: Competency of skilled birth attendants; the enabling environment for skilled attendance at delivery; in-hospital delays in obstetric care (documenting the third delay). *Operations Research Results.* Bethesda, MD: Published for USAID by the Quality Assurance Project (QAP).

Edson WN, P Ayabaca, M Bucagu, BR Burkhalter, S Gbangbade, SA Harvey, and A McCaw-Binns. 2006. Safe motherhood studies—Timeliness of in-hospital care for treating obstetric emergencies: Results from Benin, Ecuador, Jamaica, and Rwanda. *Operations Research Results. Operations Research Results.* Bethesda, MD: Published for USAID by QAP.

Gbangbade S, S Harvey, W Edson, B Burkhalter, and C Antonakos. 2003. Safe motherhood studies—results from Benin: Competency of skilled birth attendants; elements of an enabling environment for skilled attendance at delivery; causes of in-facility delays in obstetric care (the third delay). *Operations Research Results.* Bethesda, MD: Published for USAID by QAP.

Harvey SA, P Ayabaca, M Bucagu, S Djibrina, WN Edson, S Gbangbade, A McCaw-Binns, and BR Burkhalter. 2004. Skilled birth attendant competence: an initial assessment in four countries, and implications for the safe motherhood movement. *Intl J Gynecol & Obstet* 87:203–10.

Hermida J and ME Robalino. 2002. Increasing compliance with maternal and child care quality standards in Ecuador. *Intl J Quality in Health Care* 14-S1: 25–34.

Kinzie B and P. Gomez P, with Chase R (editor). 2004. *Basic Maternal and Newborn Care: A Guide for Skilled Providers.* Maternal and Neonatal Health Program. Baltimore: JHPIEGO.

Maine D, TM Wardlaw, VM Ward, et al. 1997. *Guidelines for Monitoring the Availability and Use of Obstetric Services,* 2nd ed. New York: UNICEF, WHO, UNFPA.

[3] QAP-prepared publications are available at www.qaproject.org.

Marquez L. 2001. Baseline assessments of essential obstetric care: Bolivia, Ecuador, and Honduras. *Technical Report Summary* 1(3). Published for USAID by QAP.

McCaw-Binns A, B Burkhalter, W Edson, SA Harvey, and C Antonakos. 2004. Safe Motherhood Studies—Results from Jamaica: Competency of Skilled Birth Attendants; The Enabling Environment for Skilled Birth Attendance at Delivery; In-Hospital Delays in Obstetric Care (Documenting the Third Delay). *Operations Research Results.* Bethesda, MD: Published for the USAID by QAP.

Miller S, Cordero M, Coleman AL, Figueroa J, Brito-Anderson S, Dabagh R, Calderon V, Caceres F, Fernandez AJ, Nunez M. 2003. Quality of care in institutionalized deliveries: the paradox of the Dominican Republic. *Intl J Gynecol & Obstet* 83: 89-103.

WHO (World Health Organization). 1994. World Health Organization partograph in management of labour. *The Lancet* 343: 1399-1401, June 4, 1994.

———. 2000. Integrated Management of Pregnancy and Childbirth (IMPAC), Managing Complications in Pregnancy and Childbirth: A Guide for Midwives and Doctors. WHO/RHR/00.7. World Health Organization, Geneva.

APPENDIX A

Tables A-1 through A-13

Table A-1. Adherence to Obstetric Care Standards In Nigeria (Adeyi and Morrow 1997)		
Task	Percentage of Cases Where Task Was Performed	Corresponds to Task in Current Study
1. Ask for time of onset of labor pains	80	
2. Ask if bag of water has broken	60	
3. Ask if bleeding from birth canal	26	
4. Ask if greenish/black discharge from birth canal	8	
5. Ask for medication before labor began	40	
6. Ask for medication since labor began	20	
7. Measure maternal pulse rate during labor	50	Yes
8. Measure blood pressure during labor	62	Yes
9. Measure temperature during labor	41	
10. Check for conjunctival pallor	45	
11. Measure fundal height	88	
12. Determine lie of fetus	91	
13. Count fetal heart rate during labor	72	Yes
14. Do vaginal exam using sterilized gloves	48	Yes
15. Give ergometrine injection	92	Yes
16. Examine placenta for completion after delivery	91	Yes
17. Examine baby for congenital abnormalities	89	
Notes: These data were obtained from observations of 360 births in 12 Nigerian health centers. Figures for the percentage of cases where task was performed to standard are approximate because they were estimated from a chart in Adeyi and Morrow (1997).		

Table A-2. Quality Scores in Baseline Assessment of Obstetric Care in Three Latin American Countries (Marquez 2001)					
Process Indicator	**Bolivia**	**Ecuador**	**Honduras**	**Pooled**	**Country Mean**
Percentage of deliveries with data recorded on blood pressure, fetal heart rate (FHR), and vaginal bleeding (from patient record)	0.0% (n = 111)	17.8% (n = 1,113)	16.3% (n = 873)	16.2% (n = 2,097)	11.4%
Average times per hour FHR measurement was recorded (from patient record)	0.46	0.63	0.20	---	0.43
Percentage of deliveries where antiseptic solution was used to prepare patient's skin (by observation)	91.7% (n = 12)	100% (n = 52)	92.3% (n = 13)	97.4% (n = 77)	94.7%
Percentage of deliveries where staff used new gloves (by observation)	75.0% (n = 12)	98.1% (n = 52)	69.2% (n = 13)	89.6% (n = 77)	80.8%
Percentage of deliveries where staff washed hands (by observation)	58.3% (n = 12)	23.1% (n = 52)	23.1% (n = 13)	28.6% (n = 77)	34.8%

Table A-3. Adherence to Norms for Labor and Delivery in the Dominican Republic (Miller et al. 2003, Table 2)

Norms never followed	Norms sometimes followed	Norms always followed
1. Protect perineum to prevent tearing. 2. Perform episiotomies only when necessary and not routinely. 3. Never push on uterus to hasten delivery. 4. Put baby to breast immediately. 5. Counsel about family planning. 6. Left lateral side preferred position for labor. 7. Catheterize bladder only if necessary. 8. Cover patient with sterile clothes. 9. Continue monitoring fetal rate in delivery ward. 10. Control delivery speed to allow normal deflection of fetal head. 11. Aspirate nares and oral pharynx after delivery of head. 12. Take patient to recovery room after insuring no abnormal bleeding and vital signs are okay.	1. Bring to delivery room when dilation is 10 cm (primiparous) or 8 cm (multiparous). 2. Guarantee patient quality care, clean birth, safe delivery. 3. Wash perineum and vulva with antiseptic solution. 4. Monitor labor, using partograph or by following curve of labor. 5. Monitor fetal heart rate and contractions every 15-30 minutes (rarely followed). 5. Place delivering woman in modified lithotomy position. 6. Give local anesthesia before performing episiotomy. 7. Deliver placenta by sustained traction on cord. 8. After delivery, check pulse, blood pressure, genital bleeding and firmness of uterus.	1. After delivery, examine cord, placenta and membranes. 2. After delivery, immediately inspect cervix with ring forceps. 3. Repair episiotomy or laceration. 4. Inspect vagina after repair; remove all gauze.

Note: Miller et al. monitored 30 norms, but only the 24 that are similar to some used in the present study are given here.

Table A-4. Description and Sources of Standards Used in This Study

Indicator[1]	Type[2]	Frequency[3]	Source (Page)[4]
Labor Phase[5]			
FHR in 1st hour[6]	M	At least every 30 min.	WHO (c57,c65); Kinzie (2.39); other
FHR after 1st hour[6]	M	At least every 30 min.	WHO (c57,c65); Kinzie (2.39)
Maternal blood pressure[7]	M	At least every 4 hours	WHO (c66); Kinzie (2.39)
Maternal pulse[8]	M	Every 30 min.	WHO (c66); Kinzie (2.39)
Interval between contractions[9]	M	Every 30 min.	WHO (c66); Kinzie (2.41)
Duration of contractions[9]	M	Every 30 min.	WHO (c66); Kinzie (2.41)
Vaginal exam[10]	M	Every 4 hours	WHO (c64)
Partograph alert line	Y-N	--	WHO (c65-c69); Kinzie (2.71,4.7-4.9)
Partograph action line	Y-N	--	WHO (c65-c69); Kinzie (2.71,4,7-4.9)
Intrapartum Phase			
Wash hands	Y-N	--	WHO (c17-c18,c22,c58);Kinzie (1.49)
Clean perineum	Y-N	--	WHO (c22,c58)
Use new or sterilized gloves	Y-N	--	WHO (c18-c19,c22); Kinzie (1.50)
Use sterile drapes and clothing	Y-N	--	Other
Protect perineum	Y-N	--	WHO (c72)
Suction newborn	Y-N	--	WHO (c72)
One hand each side baby's head	Y-N	--	WHO (c72); Kinzie (2.75)
Clamp and cut umbilical cord	Y-N	--	WHO (c73)
Use sterile instrument to cut cord	Y-N	--	Other
Put baby skin-to-skin with mother	Y-N	--	WHO (c73); Kinzie (2.77)
Dry and cover newborn	Y-N	--	WHO (c73); Kinzie (2.77)
Give oxytocin after delivery	Y-N	--	WHO (c73,c74); Kinzie (2.78)
Observe or manage placenta delivery	Y-N	--	WHO (c74-c75); Kinzie (2.78)
Confirm uterus is well contracted	Y-N	--	WHO (c75); Kinzie (2.80)
Examine vulva-perineal region	Y-N	--	WHO (c75); Kinzie (2.79)
Examine birth canal	Y-N	--	WHO (s31)
Examine placenta	Y-N	--	WHO (c75); Kinzie (2.79)
Mother Postpartum Phase			
Maternal pulse and blood pressure	M	Every 15 min.	Kinzie (2.39)
Check uterine retraction	Y-N	--	WHO (c75)
Check genitalia for hemorrhage	Y-N	--	WHO (c75)
Initiate breastfeeding within 2 hours[11]	Y-N	--	WHO (c78), Kinzie (2.80)
Check mother's temperature	Y-N	--	Kinzie (2.39,2.80)
Newborn Postpartum Phase			
Color and respiration	M	Every 5 min.	WHO (c75); Kinzie (2.46)
Temperature	M	Every 15 min.	WHO (c76); Kinzie (2.46)
Bleeding from cord[12]	M	Every 15 min.	WHO (c76)
Put antimicrobials in baby's eyes	Y-N	--	WHO (c76); Kinzie (2.82)
Breastfeeding on demand[11]	Y-N	--	WHO (c76,c78); Kinzie (2.82)
Constant supervision	Y-N	--	WHO (c76)
Blood and meconium cleaned	Y-N	--	WHO (c76)

Notes: 1. Further description of the indicators is in Appendix B and in the sources. 2. "M" is monitoring variable; "Y-N" is yes-no variable. 3. Frequency applies to monitoring variables only. 4. Sources are WHO (2000) and Kinzie et al. (2004); the latter was published after our data collection and was used only during analysis. 5. These labor-monitoring frequency standards are those for the active phase of 1st stage labor. 6. For FHR monitoring during the latent phase of 1st stage labor, Kinzie recommends every 4 hours, and during the early (pushing) phase of 2nd stage labor, WHO and Kinzie recommend every 5 minutes 7. For maternal blood pressure monitoring, Kinzie recommends every 4 hours during the latent phase of 1st stage labor, and at least once during the early (pushing) phase of 2nd stage labor (as well as the late phase of 2nd stage labor). 8. For maternal pulse monitoring, Kinzie recommends every 4 hours during the latent phase of 1st stage labor, and every 5 minutes during the early (pushing) phase of 2nd stage labor (as well as the late phase of 2nd stage labor). 9. For the monitoring of contractions (intervals and duration), Kinzie recommends every 4 hours during the latent phase of 1st stage labor, and WHO and Kinzie recommend every 30 minutes during the early (pushing) phase of 2nd stage labor (as well as the late phase of 2nd stage labor). (Notes continue on the next page.)

10. For vaginal exams, WHO recommends once every hour during the 2nd stage of labor. 11. Both WHO (2000) and Kinzie et al. (2004) state that breastfeeding should be initiated only if the mother desires it, which is more conditional than the breastfeeding standards used in this study. 12. Data were obtained on whether the number of blood vessels in the cord was counted and recorded, but not analyzed due to lack of consensus about the need for this indicator.

Table A-5. Labor Monitoring: Frequency (Average Times per Hour) by Country, Hospital Type, and Overall[1,2]

Indicator	Std[3] (x / hr)	Country				Hospital Type		Overall
		Benin Ave (StDev)	Ecuador Ave (StDev)	Jamaica Ave (StDev)	Rwanda Ave (StDev)	Referral Ave (StDev)	Distr/Reg[4] Ave (StDev)	Ave (StDev)
FHR (all hours)	2	1.72 (1.32)	1.16 (1.08)	1.13 (1.03)	1.29 (1.16)	1.35 (1.15)	1.25 (1,16)	1.30 (1.15)
Blood pressure	0.25	0.85 (0.98)	0.73 (0.79)	0.72 (0.62)	0.30 (0.45)	0.58 (0.64)	0.67 (0.82)	0.63 (0.73)
Pulse	2	0.25 (0.48)	0.48 (0.67)	0.76 (0.57)	0.15 (0.42)	0.51 (0.62)	0.33 (0.54)*	0.43 (0.59)
Intervals between contractions	2	0.08 (0.19)	0.60 (0.77)	0.51 (0.67)	0.28(0.57)*	0.32 (0.42)	0.44 (0.79)	0.38 (0.62)
Contraction duration	2	0.18 (0.40)	0.64 (0.77)	0.42 (0.67)	0.25 (0.58)	0.31 (0.44)	0.43 (0.80)	0.36 (0.64)
Vaginal exam	0.25	1.91 (1.35)	1.01 (1.10)	0.58 (0.57)	1.16 (1.00)	1.06 (1.00)	1.15 (1.19)	1.10 (1.09)
Mean score, all six indicators	--	0.87 (0.55)	0.79 (0.71)	0.70 (0.53)	0.60 (0.49)	0.72 (0.52)	0.73 (0.62)	0.72 (0.57)

Notes: 1. Average frequency was calculated as the number of times monitored divided by the number of minutes from arrival to end of labor phase. For each indicator, the frequency was calculated for each case, and then the average and standard deviation were calculated for all valid cases by country, hospital type, and overall, always pooling cases. 2. Sample sizes (number of valid cases) for the six indicators are: Benin (39), Ecuador (37), Jamaica (61), Rwanda (56), referral hospitals (103), district/regional hospitals (90), and overall (193). Six cases were excluded from the calculations because the number of minutes from arrival to the end of the labor phase was 12 minutes or less: one in Benin, three in Jamaica, and two in Rwanda. 3. This column shows the minimum times per hour the indicator should be monitored according to international standards (the sources of these standards are in Table A-4). 4. Differences among the four country scores for each indicator were examined with Chi-squared, and differences between hospital types using a Z-test, with significant differences at the 0.05 level, noted by *. Differences without asterisks are not significant ($p > 0.05$).

Table A-6. Labor Monitoring: Percentage of Cases Checked at Least Once, by Country and Hospital Type[1]

Indicator	Country				Hospital Type		Overall
	Benin Percent (x/y)	Ecuador Percent (x/y)	Jamaica Percent (x/y)	Rwanda[4] Percent (x/y)	Referral Percent (x/y)	Distr/Reg. Percent (x/y)	Percent (x/y)
1. FHR (first hour)	100 (41/41)	75.7 (28/37)	86.1 (68/79)	93.1 (54/58)	92.5(111/120)	84.2 (80/95)	88.8 (191/215)
2. FHR (all hours)	100 (41/41)	78.4 (29/37)	92.4 (73/79)	98.3 (57/58)	94.2(113/120)	91.6 (87/95)	93.0 (200/215)
3. Blood pressure	85.4 (35/41)	78.4 (29/37)	88.6 (70/79)	60.3 (35/58)	79.2 (95/120)	77.9 (74/95)	78.6 (169/215)
4. Pulse	36.6 (15/41)	64.9 (24/37)	89.9 (71/79)	31.0(18/58)***	63.3 (76/120)	54.7 (52/95)	59.5 (128/215)
5. Intervals between contractions	24.4 (10/41)	64.9 (24/37)	65.8 (52/79)	53.4 (31/58) *	57.5 (69/120)	50.5 (48/95)	54.4 (117/215)
6. Contractions duration	31.7 (13/41)	67.6 (25/37)	54.4 (43/79)	50.0 (29/58)	55.0 (66/120)	46.3 (44/95)	51.2 (110/215)
7. Vaginal exam	100 (41/41)	86.5 (32/37)	86.1 (68/79)	96.6 (56/58)	90.8(109/120)	92.6 (88/95)	91.6 (197/215)
8. All cases in indicators #2-#7 pooled	63.0 (155/246)	73.4 (163/222)	79.5 (377/474)	64.9 * (226/348)	73.3 (528/720)	68.9 (393/570)	71.4 (921/1290)

Notes: 1. All calculations are pooled cases. Percentage is calculated as number of cases monitored for this variable at least once (x in parenthesis) divided by the sample size (number of valid cases) for the category (y in parenthesis). 2. Asterisks indicate significant differences among the four countries at the 0.05 level (*) or 0.001 level (***) by the Chi-squared test. Differences between hospital types were analyzed using the Chi-squared (Yates correction) test, but none was statistically significant.

Table A-7. Relationships between Partograph Performance and Frequency of Labor Monitoring[1]

Indicator	Country			Hospital Type		Overall
	Benin	Ecuador	Rwanda	Referral	Distr/Reg	
Partograph Performance[2]	Mean (StDev,n)	Mean (StDev,n)	Mean(StDev,n)	Mean (StDev,n)	Mean(StDev,n)	Mean (StDev,n)
Composite[3]						
Partograph completed to standard	0.77 (0.43,26)	0.89 (0.35, 9)	0.57 (0.58,25)	0.60 (0.49,25)	0.78 (0.50,35)	0.70 (0.50,60)
Partograph not completed to standard	0.60 (0.42,13)***	0.67(0.74,28)	0.41 (0.24,25)	0.55 (0.37,33)	0.56 (0.68,33)**	0.56 (0.54,66)*
Specific Indicator						
FHR freq. if:[4]						
Partograph completed to standard	1.20 (0.66,17)	1.03 (0.62, 8)	0.66 (0.54,19)	0.77 (0.57,19)	1.06 (0.68,25)	0.94 (0.64,44)
Partograph not completed to standard	0.46 (0.45, 8)	0.70 (0.79,16)	0.64 (0.72,18)	0.72 (0.80,23)	0.51 (0.54,19)	0.63(0.70,42)
Blood pressure freq. if:						
Partograph completed to standard	0.88 (1.04,26)	0.97 (0.57, 9)	0.33 (0.59,25)	0.51 (0.71,25)	0.78 (0.93,35)	0.66 (0.85,60)
Partograph not completed to standard	0.78 (0.89,13)	0.65 (0.84,28)	0.29 (0.30,25)	0.45 (0.50,33)	0.64 (0.88,33)	0.54 (0.72,66)
Pulse freq. if:						
Partograph completed to standard	0.29 (0.54,26)	0.74 (0.49, 9)	0.19 (0.56,25)	0.37 (0.70,25)	0.27 (0.45,35)	0.31 (0.56,60)
Partograph not completed to standard	0.18 (0.36,13)	0.39(0.71,28)	0.15 (0.28,25)	0.23 (0.36,33)	0.30 (0.65,33)	0.26 (0.52,66)
Interval freq. if:						
Partograph completed to standard	0.11 (0.23,26)	0.84 (0.47, 9)	0.45 (0.81,25)	0.18 (0.36,25)	0.49 (0.73,35)	0.36 (0.62.60)
Partograph not completed to standard	0.02 (0.06,13)	0.53(0.84,28)	0.17 (0.21,25)	0.26 (0.34,33)	0.33 (0.78,33)	0.29 (0.60,66)
Duration freq. if:						
Partograph completed to standard	0.26 (0.47,26)	0.86 (0.49, 9)	0.39 (0.84,25)	0.33 (0.53,25)	0.45 (0.76,35)	0.40 (0.67,60)
Partograph not completed to standard	0.02 (0.06,13)*	0.57 (0.83,28)	0.16 (0.20,25)	0.25 (0.33,33)	0.37 (0.78,33)	0.31 (0.60,66)
Vaginal exam freq. if:						
Partograph completed to standard	1.90 (1.23,26)	0.84 (0.45, 9)	1.24 (1.19,25)	1.33 (1.02,25)	1.57 (1.29,35)	1.47 (1.19,60)
Partograph not completed to standard	1.94 (1.62,13)	1.06 (1.24,28)	1.07(0.88,25)	1.38 (1.21,33)	1.09 (1.26,33)	1.24 (1.24,66)

Notes: 1. Each case has six labor monitoring indicators (listed in left-hand column). All frequencies are average number of times per hour that the indicator was checked. 2. The partograph task was considered performed to standard if either the Alert line or the Action line was done correctly. 3. The composite score for a particular case is the average of all the indicator frequencies for that case, but the average frequency for a group of cases is the pooled average frequency across all indicators and cases in the group. 4. "Freq." = frequency. FHR in this table excludes the first hour of labor and refers to FHR checks in the second and subsequent hours after arrival, except for deliveries occurring within the first 12 minutes or less of the second hour. 5. Asterisks indicate a significant difference in the partograph-to-standard and not-to-standard scores at the 0.05 level (*) or 0.001 level (***), using a Z-test. All comparisons without asterisks are not significant ($p > 0.05$).

Table A-8. Relationships between Partograph Performance and Percentage of Labor Indicators Monitored at Least Once[1]

Indicator: Partograph Performance[2]	Country			Hospital Type		Overall
	Benin	Ecuador	Rwanda	Referral	Distr/Reg	
	% Yes (x/y)	% Yes (x/y)	% Yes (x/y)	% Yes (x/y)	% Yes (x/y)	% Yes (x/y)
Composite[3]						
Partograph completed to standard	64.3 (108/168)	96.3 (52/54)	66.0 (99/150)	71.2 (111/156)	68.5 (148/216)	69.6 (259/372)
Partograph not completed to standard	60.3 (47/78)	66.1(111/168)***	69.2 (108/156)	72.1 (147/204)	60.1 (119/198)	66.2 (266/402)
Specific Indicator						
FHR ok if:[4]						
Partograph completed to standard	100 (28/28)	100 (9/9)	100 (25/25)	100 (26/26)	100 (36/36)	100 (62/62)
Partograph not completed to standard	100 (13/13)	71.4 (20/28)	96.2 (25/26)	94.1 (32/34)	78.8 (26/33)**	86.6 (58/67)**
Blood pressure ok if:						
Partograph completed to standard	85.7 (24/28)	100 (9/9)	56.0 (14/25)	80.8 (21/26)	72.2 (26/36)	75.8 (47/62)
Partograph not completed to standard	84.6 (11/13)	71.4 (20/28)	73.1 (19/26)	76.5 (26/34)	72.7 (24/33)	74.6 (50/67)
Pulse ok if:						
Partograph completed to standard	32.1 (9/28)	100 (9/9)	24.0 (6/25)	42.3 (11/26)	36.1 (13/36)	38.7 (24/62)
Partograph not completed to standard	46.2 (6/13)	53.6 (15/28)*	42.3 (11/26)	50.0 (17/34)	45.5 (15/33)	47.8 (32/67)
Interval ok if:						
Partograph completed to standard	28.6 (8/28)	88.9 (8/9)	60.0 (15/25)	42.3 (11/26)	55.6 (20/36)	50.0 (31/62)
Partograph not completed to standard	15.4 (2/13)	57.1 (16/28)	53.8 (14/26)	55.9 (19/34)	39.4 (13/33)	47.8 (32/67)
Duration ok if:						
Partograph completed to standard	39.3 (11/28)	88.9 (8/9)	56.0 (14/25)	61.5 (16/26)	47.2 (17/36)	53.2 (33/62)
Partograph not completed to standard	15.4 (2/13)	60.7 (17/28)	53.8 (14/26)	55.9 (19/34)	42.4 (14/33)	49.3 (33/67)
Vaginal exam if:						
Partograph completed to standard	100 (28/28)	100 (9/9)	100 (25/25)	100 (26/26)	100 (36/36)	100 (62/62)
Partograph not completed to standard	100 (13/13)	82.1 (23/28)	96.2 (25/26)	100 (34/34)	81.8 (27/33)*	91.0 (61/67)*

Notes: 1. Each case has six indicators (listed in left column); each indicator was assigned the value 1 if it was monitored at least once. 2. The partograph task was considered performed to standard if either the Alert line or the Action line was done correctly. 3. The composite score is the proportion of indicators monitored at least once across all cases. 4. "OK" = done at least once. FHR in this table refers to FHR checks in first and subsequent hours after arrival, except for deliveries in 12 minutes or less after arrival. 5. Asterisks indicate a significant difference in the partograph-to-standard and not-to-standard scores at the 0.05 level (*) or 0.01 level, using a Chi-squared test with Yates correction. All comparisons without asterisks are not significant ($p > 0.05$).

Table A-9a. Recorded Observations (Yes, No, Missing, Not Observed) by Task during Intrapartum Phase, by Country

Task	Benin					Ecuador					Jamaica					Rwanda				
	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%
Wash hands	5	27	0	9	15.6	13	22	6	0	31.7	38	13	0	52	74.5	0	45	2	13	0.0
Clean perineum	14	20	0	7	41.2	39	2	0	0	95.1	45	7	2	49	83.3	23	21	3	13	48.9
Use new or re-sterilized gloves	35	1	0	5	97.2	41	0	0	0	100	52	0	3	48	94.5	47	0	1	12	97.9
Use sterile drape-clothing	2	33	1	5	5.6	39	2	0	0	95.1	19	32	4	48	34.5	39	9	0	12	81.3
Protect perineum	34	0	0	7	100	36	5	0	0	87.8	47	6	0	50	88.7	39	7	0	14	84.8
Suction newborn	0	25	7	9	0.0	15	26	0	0	36.6	14	35	2	52	27.5	9	39	0	12	18.8
One hand each side of baby's head	33	0	0	8	100	38	3	0	0	92.7	46	6	1	50	86.8	38	6	2	14	82.6
Clamp and cut umbilical cord	31	0	5	5	86.1	40	1	0	0	97.6	52	0	3	48	94.5	47	0	1	12	97.9
Use sterile instrument to cut cord	36	0	0	5	100	41	0	0	0	100	52	0	2	49	96.3	48	0	0	12	100
Put baby skin-to-skin with mother	22	13	1	5	61.1	4	37	0	0	9.8	21	27	2	53	42.0	4	41	2	13	8.5
Dry and cover newborn	33	0	1	7	97.1	41	0	0	0	100	51	1	2	49	94.4	47	1	0	12	97.9
Give mother oxytocin after delivery	28	1	5	7	82.4	15	26	0	0	36.6	47	3	5	48	85.5	33	12	2	13	70.2
Observed/manage placenta delivery	26	0	10	5	72.2	41	0	0	0	100	44	0	10	49	81.5	40	3	5	12	83.3
Confirm uterus was well-contracted	34	2	0	5	94.4	32	7	1	1	80.0	54	0	1	48	98.2	29	17	0	14	63.0
Examine vulval-perineal region	34	2	0	5	94.4	39	2	0	0	95.1	53	0	2	48	96.4	42	5	0	13	89.4
Examine birth canal	20	14	1	6	57.1	37	4	0	0	90.2	54	1	0	48	98.2	10	33	0	17	23.3
Examine placenta	26	7	0	8	78.8	29	12	0	0	70.7	51	2	0	50	96.2	26	23	0	11	53.1
All cases in all indicators pooled	413	145	31	108	70.1	540	149	7	1	77.6	740	133	39	839	81.1	521	262	18	219	65.0

Notes: "Mis" = missing data, but not judged to be "not observed"; "out" = not observed; "%" = Yes/(Yes+No+Missing).

Table A-9b. Recorded Observations (Yes, No, Missing, and Not Observed) by Task during Intrapartum Phase, by Hospital Type and Overall

Task	Referral Hospitals					District/Regional Hospitals					Overall				
	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%
Provider washed hands	31	48	7	52	36.0	25	59	1	22	29.4	56	107	8	74	32.7
Perineum cleaned	60	26	5	47	65.9	61	24	0	22	71.8	121	50	5	69	68.8
Used new or re-sterilized gloves	89	1	4	44	94.7	86	0	0	21	100	175	1	4	65	97.2
Provider used sterile drape-clothing	46	45	3	44	48.9	53	31	2	21	61.6	99	76	5	65	55.0
Protected perineum	83	7	0	48	92.2	73	11	0	23	86.9	156	18	0	71	89.7
Suctioned newborn	21	61	4	52	24.4	17	64	5	21	19.8	38	125	9	73	22.1
One hand on each side of baby's head	79	8	2	49	88.8	76	7	1	23	90.5	155	15	3	72	89.6
Clamp and cut umbilical cord	89	0	4	45	95.7	81	1	5	20	93.1	170	1	9	65	94.4
Used sterile instrument to cut cord	90	0	2	46	97.8	87	0	0	20	100	177	0	2	66	98.9
Baby put skin-to-skin with mother	32	53	3	50	36.4	19	65	2	21	22.1	51	118	5	71	29.3
Dry & cover newborn	87	1	3	47	95.6	85	1	0	21	98.8	172	2	3	68	97.2
Give mother oxytocin after delivery	72	12	9	45	77.4	51	30	3	23	60.7	123	42	12	68	69.5
Observed managed delivery of placenta	74	1	17	46	80.4	77	2	8	20	88.5	151	3	25	66	84.4
Confirmed uterus was well-contracted	79	13	1	45	84.9	70	13	1	23	83.3	149	26	2	68	84.2
Examined vulval-perineal region	87	5	1	45	93.5	81	4	1	21	94.2	168	9	2	66	93.9
Examined birth canal	62	28	0	48	68.9	59	24	1	23	70.2	121	52	1	71	69.5
Examined placenta	76	14	0	48	84.4	56	30	0	21	65.1	132	44	0	69	75.0
All cases in all indicators pooled	1157	323	65	801	74.9	1057	366	30	366	72.7	2214	689	95	1167	73.8

Notes: "Mis" = missing data, but not judged to be "not observed"; "out" = not observed; "%" = Yes/ (Yes+No+Missing).

Table A-10. Postpartum Mother and Baby Monitoring Frequency by Country, Hospital Type, and Overall[1]

Indicator	Std[2]	Country				Hospital Type		Overall
		Benin	Ecuador	Jamaica	Rwanda[4]	Referral	Distr/Reg	
		Ave(StDev)	Ave(StDev)	Ave(StDev)	Ave (StDev)	Ave (StDev)	Ave (StDev)	Ave (StDev)
Maternal		n=33	n=41	n=57	n=46	n=93	n=84	n=177
Pulse/blood pressure	4	0.48(0.33)	0.17(0.31)	1.16(1.25)[3]	0.15(0.33) ***	0.56 (0.95)	0.52 (0.95)	0.54 (0.87)
Newborn		n = 31	n = 41	n = 51	n = 46	n = 85	n = 84	n = 169
Color & respiration	12	0.95(0.46)	0.65(0.31)	1.47(1.36)	1.11(0.98)	1.17 (1.10)	0.98 (0.85)	1.08 (0.98)
Temperature	4	0.16(0.32)	0.38(0.25)	0.42(0.62)	0.00(0.00)*	0.23 (0.45)	0.27 (0.40)	0.25 (0.42)
Bleeding from cord	4	0.32(0.33)	0.40(0.28)	0.58(0.73)	0.14(0.39)*	0.37 (0.55)	0.37 (0.48)	0.37 (0.52)
Pooled: All newborn cases	--	0.48(0.51)	0.48(0.31)	0.82(1.06)	0.42(0.78)*	0.93 (0.68)	0.54 (0.86)	0.56 (0.78)

Notes: 1. For each indicator, frequency (times per hour) is calculated for each case, and then an average and standard deviation are calculated of all valid cases for each country, hospital type, and overall, always pooling cases. 2. The Standard column shows the minimum times per hour the indicator should be monitored according to international standards. Sources for the standards are in Table A-4. 3. Three outliers were excluded from the calculations (two from Jamaica and one from Rwanda) because they fell outside the 1–3-hour limits on the postpartum observation period. 4. Asterisks indicate significant differences among the four countries at the 0.05 (*) or 0.001 level (***), using ANOVA. Difference between hospital types were analyzed using the Z-test. None were significant at the $p > 0.05$ level.

Table A-11. Postpartum Mother and Baby Monitoring: Percentage of Cases Checked at Least Once by Country, Hospital Type, and Overall[1]

Indicator	Country				Hospital Type		Overall
	Benin	Ecuador	Jamaica	Rwanda[2]	Referral	Distr/Reg[2]	
	Percent (x/y)	Percent (x/y)	Percent (x/y)	Percent (x/y)	Percent(x/y)	Percent (x/y)	Percent (x/y)
Maternal							
Pulse/blood pressure	75.8 (25/33)	26.8 (11/41)	93.0 (53/57)	19.6 (9/46)***	55.9(52/93)	54.8(46/84)	55.4 (98/177)
Newborn							
Color & respiration	96.8 (30/31)	97.6 (40/41)	90.2 (46/51)	67.4 (31/46)	84.7(72/85)	89.3(75/84)	87.0 (147/169)
Baby's temperature	22.6 (7/31)	73.2 (30/41)	45.1 (23/51)	0.0 (0/46)***	29.4(25/85)	41.7(35/84)	35.5 (60/169)
Bleeding from cord	54.8 (17/31)	73.2 (30/41)	54.9 (28/51)	15.2 (7/46)***	45.9(39/85)	51.2(43/84)	48.5 (82/169)
Pooled: All newborn cases	58.1 (54/93)	81.3 (100/123)	63.4 (97/153)	27.5 *** (38/138)	53.3 (136/255)	60.7 (153/252)	57.0 (289/507)

Notes: 1. All calculations are pooled cases. Percentage is calculated as number of cases monitored at least once, divided by the sample size (number of valid cases) for the category. The number of cases monitored equals "x" and the number of valid cases equals "y." 2. Asterisks indicate significant differences among the four countries at the 0.001 level by the Chi-squared test. Difference between hospital types were analyzed using the Chi-squared (Yates correction) test. Comparisons without asterisks are not significant ($p > 0.05$), including all differences between hospital types.

Table A-12a. Recorded Observations (Yes, No, Missing, and Not Observed) by Task during Postpartum Phases, by Country

	Benin					Ecuador					Jamaica					Rwanda				
	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%
Mother PP Phase																				
Check uterine retraction	32	2	0	7	94.1	30	10	1	0	73.2	55	2	2	44	93.2	18	25	1	16	40.9
Check external genitalia for hemorrhage	32	2	0	7	94.1	28	12	1	0	68.3	55	2	2	44	93.2	14	29	0	17	32.6
Initiate breastfeeding within 2 hours	5	22	4	10	16.1	29	12	0	0	70.7	32	9	12	50	60.4	1	33	1	25	2.9
Check temperature	7	26	0	8	21.2	2	39	0	0	4.9	46	4	6	47	82.1	0	44	0	16	0.0
Baby PP Phase																				
Antimicrobial drops/ointment in eyes	34	0	0	7	100	41	0	0	0	100	44	4	2	53	88.0	21	27	0	12	43.8
Breastfed on demand	7	22	2	10	22.6	29	12	0	0	70.7	32	11	6	54	65.3	2	38	0	20	5.0
Constant supervision	8	19	6	8	24.2	8	32	1	0	19.5	41	5	4	53	82.0	24	20	0	16	54.5
Blood and meconium cleaned	28	4	2	7	82.4	37	4	0	0	90.2	48	0	3	52	94.1	36	13	0	11	73.5

Notes: "Mis" = missing data, but not judged to be "not observed"; "out" = not observed; "%" = (Yes) / (Yes+No+Missing).

Table A-12b. Recorded Observations (Yes, No, Missing, Not Observed) by Task during Postpartum Phases, by Hospital Type and Overall

	Referral Hospitals					District/Regional Hospitals					Overall				
	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%	Yes	No	Mis	Out	%
Mother PP Phase															
Check uterine retraction	66	24	2	45	71.7	69	15	2	22	80.2	135	39	4	67	75.8
Check external genitalia for hemorrhage	66	23	2	46	72.5	63	22	1	22	73.3	129	45	3	68	72.9
Initiate breastfeeding within 2 hours	27	43	11	56	33.3	40	33	6	29	50.6	67	76	17	85	41.9
Check temperature	35	49	6	47	38.9	20	64	0	24	23.8	55	113	6	71	31.6
Baby PP Phase															
Antimicrobial drops/ointment in eyes	71	15	2	49	80.7	69	16	0	23	81.2	140	31	2	72	80.9
Breastfed on demand	26	49	5	57	32.5	44	34	3	27	54.3	70	83	8	84	43.5
Constant supervision	56	22	7	52	65.9	25	54	4	25	30.1	81	76	11	77	48.2
Blood and meconium cleaned	77	8	4	48	86.5	72	13	1	22	83.7	149	21	5	70	85.1

Notes: "Mis" = missing data, but not judged to be "not observed"; "out" = not observed; "%" = (Yes) / (Yes+No+Missing).

Table A-13. Comparison of Task Performance in QAP Four-Country Study to That in Previous Studies: Percentage of Cases Meeting Standard[1]

Indicator	Four-Country Study[2]				Adeyi et al. (1997)	Marquez (2001)		Hermida et al. (2002)	Miller et al. (2003)
	Pooled	Benin, Rwanda	Ecuador	Jamaica	Nigeria	Latin Pooled	Ecuador	Ecuador	Dom. Rep.
1. Correct partograph use	47		22	--				5	Sometimes
2. Measure pulse during labor (at least once)	60	37, 31			50				
3. Measure blood pressure during labor (at least once)	79	85, 60	78		62	16[4]	18[4]	18[4]	
4. Count FHR during labor (at least once)	93	100, 98	78	92	72				Sometimes
5. Average frequency (times/hr) FHR checked during labor[3]	1.30		1.16			0.43	0.63		
6. Do vaginal exam during labor (at least once)	92	100, 97	87		48[5]				
7. Use sterile or new gloves	97	97, 98	100			90	98		
8. Wash hands	33		32			29	23		
9. Clean perineum with antiseptic	69		95	83		97	100		Sometimes
10. Give oxytocin (ergometrine) after delivery	70	82, 70			92				
11. Examine placenta	75	79, 53		96	91				Always

Notes: 1. Performance of some indicators reported in our study was also reported in other studies from developing countries, as summarized here. More on the other studies is in the Introduction and Tables A-1–3. Standards may have been defined differently in each study, although all standards assume performed/not performed. 2. Performance scores in our study are reported for individual countries only when one of the other studies reports results from the same country or a country in the same region (Benin and Rwanda for comparison to Nigeria; Jamaica for comparison to the Dominican Republic). 3. This is the only indicator here that is an average frequency and not a percentage of cases that meet standard. 4. These figures reflect the percentage of cases that were monitored for each of three indicators at least once during labor (blood pressure, FHR and vaginal bleeding), and so are not comparable to the results reported in the four-country study, although the results of the four-country study seem to be higher even accounting for the different definitions. 5. This figure reflects the percentage of cases that did a vaginal exam using sterilized gloves, and so is not directly comparable to the results in the four-country study that separates the vaginal exam during labor and use of sterile gloves during the intrapartum phase.

APPENDIX B

Data Collection Instrument
Performance in Managing the 3 Stages of Normal Labor & Delivery

PERFORMANCE IN MANAGING THE 3 STAGES OF NORMAL LABOR & DELIVERY

A. Basic Data for the Case

1. Observer's name: _____
2. Name of the hospital: _____
3. Date: ____ ____ ____ (dd mm yy)
4. Patient's clinical record #: _____

Patient demographic data

5. Age..... ____

6. Previous births*..... ____
** live or stillborn; if patient is primipara, enter "0"*

7. First language
   - ____ English [1]
   - ____ TBD [2]
   - ____ Other [3] (specify):

8. Ethnic group
   - ____
   - ____ (TBD)
   - ____

9. Is the patient accompanied by anyone (spouse, other family member, friend)? **Yes** [1] ____ **No** [2] ____

10. *(Write an "X" in the appropriate box)*

		Yes [1]	No [2]	N/A* [3]
10.1	Has the patient been diagnosed with tuberculosis?.....			
10.2	Has the patient been diagnosed with HIV/AIDS?.....			
10.3	Has the patient been diagnosed with syphilis?.....			
10.4	Has the patient been diagnosed with any other STI?.....			

** N/A = "diagnosis unknown or not available"*

List of participating providers

11. Providers participating in this birth

Instructions: *during the course of any labor and delivery, a series of different health providers may attend the patient. Please enter below the ID number of each provider participating in this case, indicating with an* **"X"** *the stage or stages in which he / she participates. At the same time, enter the provider's ID number on the register of providers kept separately.*

No.	Provider ID Number*	Stage of birth: Labor	Expulsive Phase	Postpartum (Mother)	Postpartum (Neonate)	Provider Type
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Provider type:
1 = Attending physician
2 = Medical resident
3 = Midwife
4 = Nurse
5 = Intern
6 = Auxiliary nurse / Aide
7 = other (describe)

** **Also enter this number in the provider register, kept separately***

B. Labor monitoring

		h h	m m	(circle one)
1.	Time at which observation begins.....		:	a.m. p.m.
2.	Time at which the baby is born.....		:	a.m. p.m.
3.	Time at which observation ends.....		:	a.m. p.m.

PERFORMANCE IN MANAGING THE 3 STAGES OF NORMAL LABOR & DELIVERY

Instructions: *In the table below, write an* **"X"** *in the appropriate box each time FHR is measured during the first hour of labor monitoring. Each box represents a lapse of 10 minutes from the beginning of the observation. In the second row, note the number of the provider who took the FHR, using the list of providers that appears on page 1. For example, if provider #2 measures and records FHR 25 minutes after the beginning of the observation, write an* **"X"** *in the box in the 3rd column (the one that says 0:21 – 0:30). In the 2nd row of the same column, write the number* **"2"**.

Minutes since observation began	0:00 – 0:10	0:11–0:20	0:21– 0:30	0:31– 0:40	0:41– 0:50	0:51– 0:60	**Total number of times measured**
Fetal Heart Rate (FHR) 1st hour: Note each time FHR is taken during 1st hour of labor monitoring.							
4.							
Provider							

Instructions: *In the table below, write an* **"X"** *in the appropriate box each time the indicated signs are measured/taken. Each box represents a lapse of 30 minutes from the beginning of the observation. In the last row, record the number of the provider who took the measure each time it is taken, using the list of providers. For example, if Provider #5 takes vital signs one hour & 45 minutes, write an* **"X"** *in the appropriate box in the 4th column (the one that says 1:31 – 2:00) and enter the number 5 in the last row of the same column.*

Time elapsed since observation began	0:00 – 0:30	0:31 – 1:00	1:01 – 1:30	1:31 – 2:00	2:01 – 2:30	2:31 – 3:00	3:01 – 3:30	3:31 – 4:00	4:01 – 4:30	4:31 – 5:00	5:00 – 5:30	5:31 – 6:30	6:01 – 6:30	6:31 – 7:00	7:01 – 7:30	7:31 – 8:00	8:01 – 8:30	8:31 – 9:00	9:01 – 9:30	9:31 – 10:00	10:01 – 10:30	10:31 – 11:00	11:01 – 11:30	**Total # times measured**
FHR (from the 2nd hour on): Note each time FHR is evaluated after the first hour of labor monitoring.																								
5.																								
Blood pressure: Note each time maternal blood pressure is taken.																								
6.																								
Pulse: Note each time maternal pulse is taken & recorded.																								
7.																								
Intervals: Note each time the interval between contractions is evaluated.																								
8.																								
Duration: Note each time duration of contractions is evaluated.																								
9.																								
Vaginal exam: Note each time a vaginal exam is performed.																								
10.																								
Provider: Using the list of providers that appears on page 1, record the number of the provider taking each measurement.																								
11.																								

PERFORMANCE IN MANAGING THE 3 STAGES OF NORMAL LABOR & DELIVERY

		Yes [1]	No [2]	Not obs [3]
12.	Is there a partograph with 2 curves? *(Write an* **"X"** *in the appropriate box)*			
	12.1 Alert line…………………………………………………………………………………………………...			
	12.2 Action line………………………………………………………………………………………………...			

13. In case of a complication, please note:

13.1 How was the complication detected? ***(use back of this sheet if necessary)***

13.2 What steps were taken by the Provider?

14. Specific comments:

PERFORMANCE IN MANAGING THE 3 STAGES OF NORMAL LABOR & DELIVERY

C. Expulsive Phase and Delivery

Instructions: *For each question, mark the appropriate box with an* **"X"**: *if the step / procedure is carried out, mark the* **"Yes"** *column. If the step / procedure is not carried out mark the* **"No"** *column. If it is not possible to observe whether the step / procedure is carried out, mark the* **"Not obs"** *column. For questions 2 – 16 record the number of the Provider carrying out the procedure. For questions 5 & 10, also record the time at which the procedure is carried out.*

		Yes [1]	No [2]	Not obs [3]
1.	1.1 Hands washed with soap or antiseptic solution……..			
	1.2 Perineum cleaned with antiseptic solution or alcohol with iodine……..……..			
	1.3 New or re-sterilized gloves used……			
	1.4 Sterile drapes and clothing used…..……..			
2.	2.1 Protect the perineum by maintaining pressure on the fetal head with the left hand to avoid rapid expulsion of the baby……			
	2.2 No. of provider who did it → → → [ ]			
3.	3.1 Suction the newborn with a rubber suction bulb after delivery of the head……..……..			
	3.2 No. of provider who did it → → → [ ]			
4.	4.1 Place one hand on each side of the baby's head and guide it down and then up again…..…..…...			
	4.2 No. of provider who did it → → → [ ]			
5.	5.1 Clamp and cut the umbilical cord……..			
	5.2 No. of provider who did it → → → [ ] 5.3 Time at which cord was cut.....	:	a.m.	p.m.
6.	6.1 Use a sterile instrument to cut the umbilical cord……..			
	6.2 No. of provider who did it → → → [ ]			
7.	7.1 Place the baby in direct skin-to-skin contact with the mother's abdomen and cover the baby with a towel or cloth that is clean & dry……..……..			
	7.2 No. of provider who did it → → → [ ]			
8.	8.1 Dry and cover newborn……..			
	8.2 No. of provider who did it → → → [ ]			
9.	9.1 Give mother oxytocin, 10 mg IM……..……..……..			
	9.2 No. of provider who did it → → → [ ] 9.3 Time at which injection given..	:	a.m.	p.m.
10.	10.1 Observe & manage delivery of the placenta……..			
	10.2 No. of provider who did it → → → [ ] 10.3 Time at which placenta delivered..	:	a.m.	p.m.
11.	11.1 Confirm that the uterus is well contracted……..……..……..			
	11.2 No. of provider who did it → → → [ ]			
12.	12.1 Examine vulval-perineal region..……			
	12.2 No. of provider who did it → → → [ ]			

PERFORMANCE IN MANAGING THE 3 STAGES OF NORMAL LABOR & DELIVERY

Instructions: *For each question, mark the appropriate box with an* **"X"**: *if the step / procedure is carried out, mark the* **"Yes"** *column. If the step / procedure is not carried out mark the* **"No"** *column. If it is not possible to observe whether the step / procedure is carried out, mark the* **"Not obs"** *column. For questions 2 – 16 record the number of the Provider carrying out the procedure. For questions 5 & 10, also record the time at which the procedure is carried out.*

		Yes [1]	No [2]	Not obs [3]
13.	13.1 Examine the birth canal…..……..……..			
	13.2 No. of provider who did it → → →			
14.	14.1 Examine the placenta (completeness of cotyledons)……....			
	14.2 No. of provider who did it → → →			
15.	15.1 Record No. of blood vessels in the cord……			
	15.2 No. of provider who did it → → →			

16. In case of a complication, please note::

16.1 How was the complication detected? **(*use back of this sheet if necessary*)**

16.2 What steps were taken by the provider?

17. Specific comments:

PERFORMANCE IN MANAGING THE 3 STAGES OF NORMAL LABOR & DELIVERY

D. Postpartum care of the Mother (First 2 hours after birth)

Instructions: *Following the same steps as before, write an* **"X"** *in the appropriate box each time pulse and blood pressure are taken. in the 2nd row, note the number of the provider using the List of Providers on page 1.*

Minutes elapsed since birth	0:00 – 0:15	00:16 – 00:30	00:31 – 00:45	00:46 – 01:00	01:01 – 01:15	01:16 – 01:30	01:31 – 01:45	01:46 – 02:00	**Total # times measured**
Times at which maternal pulse and blood pressure taken									
1.									
Provider									

Instructions: *For each question, mark the appropriate box with an* **"X"**: *if the step / procedure is carried out, mark* **"Yes"**. *If the step / procedure is not carried out mark* **"No"**. *If it is not possible to observe whether the step / procedure is carried out, mark* **"Not obs"**. *Also record the number of provider carrying out procedure.*

		Yes [1]	**No** [2]	**Not obs** [3]
2.	2.1 Check uterine retraction by touching the fundus of the uterus……..			
	2.2 No. of provider who did it → → →			
3.	3.1 Check external genitalia for signs of hemorrhage……..…….....			
	3.2 No. of provider who did it → → →			
4.	4.1 Initiate breast feeding within the 1st two hours after birth..……....			
	4.2 No. of provider who did it → → →		4.3 Time breast feeding initiated……	: a.m. p.m.
5.	5.1 Check the mother's temperature ……..…….……..			
	5.2 No. of provider who did it → → →			

6. In case of a complication, please note::

   6.1 How was the complication detected? (***use back of this sheet if necessary***)

   _____

   _____

   _____

   6.2 What steps were taken by the Provider?

   _____

   _____

   _____

7. Specific comments:

   _____

   _____

   _____

   _____

   _____

PERFORMANCE IN MANAGING THE 3 STAGES OF NORMAL LABOR & DELIVERY

E. Postpartum care of the Baby (First 2 hours after birth)

Instructions: *follow the same procedures as in the previous questions.*

Minutes elapsed since birth	:00 – :05	:06 – :10	:11 – :15	:16– :20	:21 – :25	:26 – :30	:31 – :35	:36– :40	:41– :45	:46 - :50	:51 - :55	:56 – 1:00	1:00 – 1:05	1:06 – 1:10	1:11 – 1:15	1:16 – 1:20	1:21 – 1:25	1:26 – 1:30	1:31 – 1:35	1:36 – 1:40	1:41 – 1:45	1:46 - 1:50	1:51 - 1:55	1:56 – 2:00	**Total # times measured**
	Note each time baby's color & respiration is checked																								
1.																									
Provider																									

Instructions: *follow the same procedures as in the previous questions.*

Minutes elapsed since birth	0:00 – 0:15	00:16 – 00:30	00:31 – 00:45	00:46 – 01:00	01:01 – 01:15	01:16 – 01:30	01:31 – 01:45	01:46 – 02:00	**Total # times measured**
	Temperature: times baby's body temperature is checked (axillary temp. or by touching the baby's feet)								
2.									
	Bleeding from the cord: times in which umbilical cord is checked for bleeding								
3.									
	Provider: record the number of the provider using the Provider List on page 1.								
4.									

Instructions: *Note whether each step / procedure is carried out. Mark an* **"X"** *in the appropriate box*

		Yes [1]	**No** [2]	**Not obs** [3]
5.	5.1 Apply antimicrobial drops or ointment to the baby's eyes…….....……..……...			
	5.2 No. of provider who did it → → →			
6.	6.1 Allow baby to breast feed on demand…….....……..…….....			
	6.2 No. of provider who did it → → →			
7.	7.1 Keep infant under constant observation (baby never left alone)…..……..……...			
	7.2 No. of provider who did it → → →			
8.	8.1 Clean blood & meconium from baby's skin.……..……..			
	8.2 No. of provider who did it → → →			

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