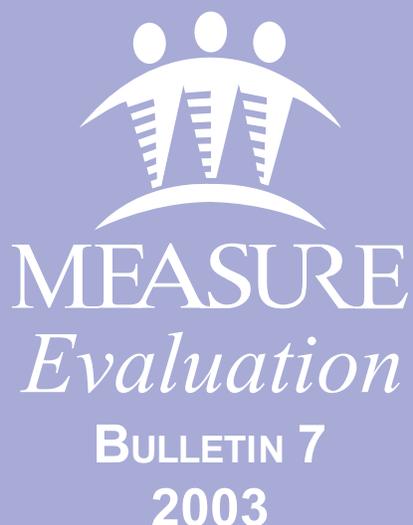


# Strengthening Monitoring & Evaluation of Maternal Health Programs



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## MEASURE *Evaluation* Bulletin 7: Strengthening Monitoring & Evaluation of Maternal Health Programs

Every year it is estimated that more than 500,000 women die as a result of pregnancy and childbirth and more than 50 million women suffer from poor reproductive health and serious pregnancy-related illness and disability. Maternal mortality is among the health indicators that reflect the greatest disparity between rich and poor countries. The 1993 World Bank Development Report showed maternal mortality and morbidity to be the major cause of loss of healthy life among women of reproductive age in developing countries. In response, a number of recent international fora, such as the 1994 International Conference on Population and Development, the 1995 World Conference for Women, and the 2000 Millennium Summit, have declared reduction in maternal mortality as one of their goals.

The increased attention to maternal health has led to an increased demand for data and indicators to monitor and evaluate the progress of international maternal health programs. However, data collection for maternal health programs raises a number of challenges: methods for measuring maternal mortality lag far behind demand for data, and self-reports of maternal morbidity have been shown to be unreliable. The problems associated with measuring maternal health outcomes have led to an increasing reliance on process indicators. These indicators measure the levels and changes in processes that are believed to influence the outcome of interest. Data for process indicators are generally easier to collect and are more readily available than data for outcome indicators.

Over the last six years, the MEASURE *Evaluation* project has undertaken a number of activities related to monitoring and evaluation of maternal health programs, under the broad

theme of exploring and strengthening use of existing maternal health data sources. This issue of the MEASURE *Evaluation* Bulletin summarizes the results of several of these activities. Two articles describe complementary studies undertaken in Guatemala and Benin that assess the status, current use, and potential use of facility-based maternity registers for monitoring maternal health programs at different system levels, including the health facility. A third article describes efforts to facilitate increased use of the Latin American Center for Perinatology database through development of web-based data analysis tools. This database contains records from over two million clinical records on pregnant women, deliveries, and newborns from health institutions throughout Latin America. Another article explores the use of an alternative data source — population censuses — to estimate maternal mortality.

The availability of maternal health services is often a constraint to their use. Rose, et al. analyzed existing data on maternal health service availability collected through the Demographic and Health Surveys (DHS) Service Availability Module (SAM). This survey data source has not been widely exploited in the past. Results are summarized in this Bulletin issue. Also presented are the results of an evaluation of traditional birth attendant training programs in Guatemala undertaken by Goldman and Gleit. This study found mixed results on the success of these programs. Finally, MEASURE *Evaluation* has compiled a web-based compendium of existing tools for monitoring and evaluation of maternal and newborn health programs that is described in the remaining article. A complete list of all MEASURE *Evaluation* publications related to maternal health can be found at the end of the issue.

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### Previous MEASURE *Evaluation* Bulletins

Bulletin 1: Monitoring the Quality of Care in Family Planning (2001)

Bulletin 2: Indicators for Monitoring and Evaluation of AIDS Programs (2001)

Bulletin 3: Monitoring Population and Health Program Efforts with Composite Indices (2001)

Bulletin 4: A New Tool to Focus and Monitor AIDS Prevention Efforts: The PLACE Method (2002)

Bulletin 5: Investing in Population, Health and Nutrition Monitoring and Evaluation: Lessons Learned (2003)

Bulletin 6: Evaluation of the Impact of Population and Health Programs (2003)



Each issue of the MEASURE *Evaluation* Bulletin addresses a specific theme, and the contents are summary papers based on research and technical assistance supported by MEASURE *Evaluation*.

The MEASURE *Evaluation* Bulletin is made possible by support from USAID under the terms of Cooperative Agreement HRN-A-00-97-00018-00. The opinions expressed are those of the authors and do not necessarily reflect the views of USAID.

# Maternity Registers in Guatemalan Facilities: A Potential Source of Data for Monitoring Obstetric Care

*Ricardo Valladares, Edgar Barillas, Sarah Bassett Hileman,  
Fannie Fonseca-Becker, Mandy Rose, and Pierre Buekens*

- » Birth registry data collected routinely in health facilities are a potentially important source of existing information that may be used to estimate maternal health and facility-based quality of care indicators.
- » In three *departamentos* of Guatemala, maternity registers were reliable sources of data for vaginal births; data on 20% of cesarean section deliveries were missing.
- » Facilities could monitor deliveries and maternal and newborn care using maternity registers if given appropriate guidelines. Surgery registers provide more complete information on cesarean sections. Data collection could be improved with preprinted registers and staff training to record delivery information.

## Introduction

The workshop “Toward Improving Monitoring and Evaluation in Maternal and Perinatal Health,” organized by MEASURE *Evaluation* in 1999, explored whether registers which record birth data at health facilities could be used to produce indicators for monitoring obstetric care. The quality and use of maternity registers within facilities was assessed in three *departamentos* in Guatemala in 2000–2001 in a pilot study to address this question.

The maternity register study in Guatemala had three objectives:

- Describe the extent, quality, and use of information that can be derived from these registers for monitoring maternal and neonatal health status.
- Calculate estimates of key obstetric care indicators from existing registers.
- Identify mechanisms for using data routinely collected in health facilities for monitoring purposes.

## Methods

The study consisted of four parts. Visits were made to public and private facilities that perform deliveries in the *departamentos* of Quiché, San Marcos, and Totonicapán to

gather information about facility characteristics, the format and content of maternity registers, and how the information was used. Data were collected from registers containing information about births (maternity, surgery, and discharge registers) and compared women's corresponding medical records to determine the degree of concurrence in the information between the sources. The different sources were compared to estimate the proportion of deliveries missing from maternity registers. Using data from maternity registers, estimates of facility-based indicators were calculated, including the proportions of cesarean births and those resulting in maternal and neonatal deaths.

## Results

The Ministry of Health (MOH) and the USAID-funded Maternal and Neonatal Health Project (MNH) provided an initial list of 22 facilities providing obstetric services in the selected *departamentos*. After visiting each facility, 22 additional facilities were identified by local health officers, for a total of 44 (Table 1). Of the 30 facilities confirming that births were attended onsite, most reported fewer than 50 deliveries per year; 27 facilities confirmed that staff recorded delivery information in maternity registers or in others such as discharge or surgery registers. Among these, 24 agreed to participate and 10 used maternity registers.

**Table 1. Number of Facilities Identified for the Study, Attending Births, Agreeing to Participate, and Having Maternity Registers**

	Quiché	San Marcos	Totonicapán	Total
<b>Identified by census</b>	11	24	9	44
<b>Attending births</b>	8	15	7	30
<b>Agreeing to participate</b>	7	11	6	24
<b>Public</b>	5	2	3	10
<b>Private</b>	2	9	3	14
<b>Having maternity registers</b>	5	3	2	10

### **Contents of Information Recorded and Further Use**

Information pertaining to the format of registers, how they are completed, and their further use in facilities was gathered by examining the registers and by holding focus group discussions with staff, and individual interviews with a person in charge of each facility. Most registers were found to be in precarious conditions. In general, they were not preprinted with labeled columns to be filled. Usually, columns were drawn by hand in pencil or ink on each page. Sometimes column labels only appeared on the first page of registers, and sometimes columns were omitted on subsequent pages causing omission of data.

Registers were typically kept where they were used. Admissions and discharge registers were located in the admissions' or secretary's office, surgery registers in the operating room, and maternity registers in the nurse station of the obstetric department. In most public facilities, registers were completed by either administrative staff or the nurse supervisor. In private facilities, the staff responsible for this task varied from the secretary or manager to physicians or nurses. In one facility, no records were kept. Only five of the 24 facilities reported formal training for completing the registers (three public and two private). The majority of staff were trained informally by a colleague or learned on the job. Two-thirds of facilities entered data in the registers only once, usually after the birth or when the patient was discharged.

These routinely collected data were not always used by the facilities. Half of the private and two public facilities did not meet or did so only infrequently to discuss figures resulting from routinely collected data. All other public facilities reported meeting to discuss data every other month or more frequently, but the substance of these meetings varied. At public facilities, more variables were discussed, and the focus tended to be on maternal mortality, neonatal mortality, and cesarean sections. In private facilities, the focus was on vaginal births. Only four facilities mentioned looking at maternal

and newborn complications, and only five examined cesareans.

Of the 14 private facilities, only four reported using routine information for setting targets and only one mentioned using it to improve the quality of care. Some private facilities used the data for budgeting purposes. Public facilities were more likely to report using the data for setting targets, such as decreasing maternal and neonatal mortality, improving quality of services, and decreasing facility cesarean rate.

### **Data Coverage and Validity**

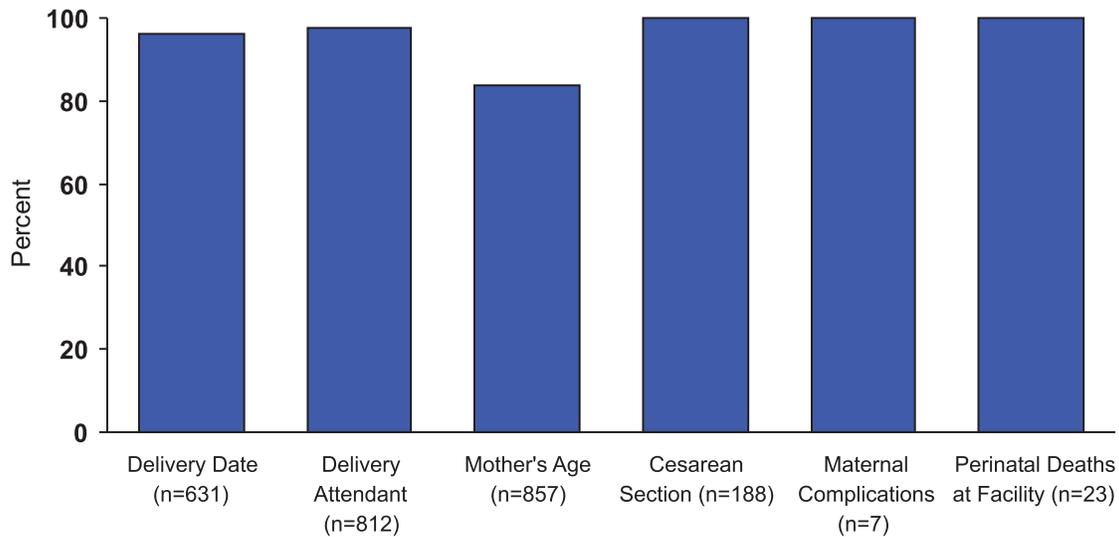
Validity of delivery information about births found in maternity registers was determined by comparing data recorded between August 2000 and September 2000 with patient medical records. Medical records were chosen as the standard because they had the most information related to delivery procedure, outcome, and complications. Although only 10 of the 24 facilities studied used maternity registers, most births occurring during the time period under study (87%) were delivered at those facilities. All but one of the facilities was public.

Data in maternity registers were found to be highly congruent with data in corresponding medical records (Figure 1). The date of delivery coincided in 96% of cases, the birth attendant in 98% of cases, and the occurrence of cesarean sections, maternal complications and deaths, and neonatal deaths in 100% of cases. Age of the mother corresponded in a smaller proportion of cases overall (84%). However, there was notable variation between *departamentos* (77% in San Marcos, 88% in Quiché, and 90% in Totonicapán).

### **Completeness of Maternity Register Data**

Data from medical records and surgery registers recorded between August 2000 and September 2000 were used to determine the proportion of deliveries missing from maternity registers. Overall, less than 1% of cases found in medical records were missing (Table 2). However, 20% of cases found in surgery registers were missing from maternity registers. In-

**Figure 1. Percent of Data in Maternity Registers Coinciding with Data in Medical Records by Variable**



formation entered into the surgery register was not always copied to the maternity register at a later time. The result is that one-fifth of cesarean births would be missed if maternity registers were the sole data source.

### Estimating Facility-Level Indicators

To estimate indicators of obstetric care at facilities using maternity registers, data recorded during a one-year time period (October 1999 to September 2000) were examined, which included more than 8,000 deliveries. The proportions of births in each *departamento* resulting in cesarean sections, maternal complications, and maternal deaths (Table 3) were calculated. The proportion of cesarean sections ranged from 19% in San Marcos to 36% in Totonicapán. This may have been caused by the high proportion of births that occur at home (59%) in Guatemala (INE, 1999), meaning that facility deliveries may be higher risk and require interventions such as cesarean sections. Few maternal complications were noted in these data, however, as less than 2% of records indicated any complication in all three *departamentos*. Cesarean sections were not counted as maternal complications, which indicates that these data may be incomplete. Only one maternal death was recorded in maternity registers during the year of reference. Because maternity registers are filled out at the time of a delivery, maternal deaths occurring outside a facility (i.e., after returning home from a facility birth) were not included.

### Conclusion

Although not all the facilities in the three *departamentos* under study kept registers devoted only to recording informa-

tion about deliveries, where maternity registers exist, coverage was good, with the vast majority of births being recorded. Further, data recorded in maternity registers match the information found in patient records for the most part. These two findings suggest that maternity registers may be considered reliable sources of data to estimate some indicators of essential obstetric services at the facility level.

However, some of the omissions may be problematic. Mother's age was the variable with the most errors across records, with one-sixth of the entries not matching patient records. Of greater concern is the one-fifth of cesarean sections absent from maternity registers signaling inconsistent recording of non-vaginal births in these registers. Additionally, the informal nature of most maternity registers and the training of staff in their completion indicates that opportunities for the unintentional omission of data exist.

Maternity registers constitute a potentially important source of existing data for monitoring facility-based maternal and infant health in Guatemala. The findings of this study indicate that if some changes are made, the registers would provide high quality data to support monitoring efforts in the *departamentos*. Maternity registers could be standardized and preprinted so that each facility collects the same information and data omissions caused by the manual procedures would be eliminated. Staff responsible for filling in the registers could be formally trained. This training should include an emphasis on recording the cesarean deliveries in surgery registers in maternity registers so all births are registered in one facility-based record. Training in how the data can be used

**Table 2. Number and Proportion of Deliveries Recorded in Medical Records and Surgery Records, but Missing from Maternity Registers by *Departamento***

	Medical Records			Surgery Registers		
	Total	Missing from Maternity Registers		Total	Missing from Maternity Registers	
		n	%		n	%
<b>Quiché</b>	491	0	0	58	8	13.8
<b>San Marcos</b>	423	3	0.7	84	28	33.3
<b>Totonicapán</b>	151	4	2.7	40	0	0
<b>Total</b>	1065	7	0.7	182	36	19.8

**Table 3. Number and Proportion Of Cesarean Sections, Maternal Complications and Maternal Deaths Recorded in Maternity Registers by *Departamento***

	Cesarean Sections			Maternal Complications			Maternal Deaths		
	Total	n	%	Total	n	%	Total	n	%
<b>Quiché</b>	2112	689	32.6	2175	16	0.7	2175	1	0.05
<b>San Marcos</b>	4764	905	19.0	4916	3	0.1	4916	0	0.0
<b>Totonicapán</b>	1477	534	36.2	1533	26	1.7	1533	0	0.0

by facilities and how best to inform clinical staff of the results would facilitate heightened interest in the registers and subsequent care in filling in the information.

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National Institute of Statistics, Guatemala (INE); Ministry of Health, Guatemala, USAID, UNICEF, UNFPA, MEASURE *DHS+*. National Maternal and Infant Health Survey (Encuesta Nacional de Salud Materno Infantil) 1998–1999. Calverton, MD: INE; 1999.

## Content, Completeness, and Use of Maternity Register Data in Two Departments in Benin

*Nicaise Kodjogbé, Léonard Fourn, and Cynthia Stanton*

- » **Maternity registers vary substantially in these two Benin departments in number, content, format, and how the data are used.**
- » **The data are remarkably complete for the specific variables included in the registers. Data were present for at least 98% of the variables included in the delivery, adverse pregnancy outcome, and surgical registers. Data were 92% complete for variables in the referral register.**
- » **Approximately 80% of the cesarean section operations recorded in surgical registers were also recorded in delivery registers. This suggests that relying only on the delivery register will not suffice for the purposes of monitoring cesarean section operations.**
- » **Of women referred to a higher level of obstetric care from public and private facilities without surgical capacity, 51% and 63%, respectively, were not recorded as having been admitted to that higher level of care.**
- » **Maternity register data are used for 1) immediate decision-making regarding clinical care for individual patients, 2) obligatory reporting to the national health information system, and 3) local planning and management, in some cases. Rarely are these data used for facility-level monitoring and evaluation for the purposes of improving quality of care.**

### **Introduction**

The Maternity Register Study in Benin was designed to assess the current and potential use of routinely collected data for the purposes of monitoring and evaluation. The study was carried out in the departments of Atlantique/Littoral and Zou/Collines (hereafter referred to as Atlantique and Zou). The objectives of the study were to describe the breadth, quality, completeness, and use of maternity register data; to use these data to calculate indicators appropriate for monitoring and evaluation; to describe the process by which these data were recorded and to validate information on cesarean section operations recorded in the delivery register. Selected results from the study are presented in this summary.

### **Methodology**

This study encompassed both quantitative and qualitative methods. The quantitative study was carried out in two phases.

The first phase consisted of a census of health facilities at which deliveries take place in both departments. This census was then used as a sampling frame from which to select a sample of public and private facilities with and without surgical capacities. Selected facilities were visited and the data required to respond to study objectives were abstracted from the registers.

The qualitative component consisted of four focus group discussions with separate groups of midwives/nurses and physicians from sampled facilities. The purpose of the qualitative component of the study was to explore the process by which data are recorded in registers and staff opinions regarding the collection and use of these data.

## Sample Description

The sample of health facilities for this study includes 48 health facilities, stratified by public or private funding and by surgical capacity. The three strata include 12 facilities with surgical capacity, 18 public facilities without surgical capacity, and 18 private facilities without surgical capacity, divided equally across the two departments. For the public and private health facilities without surgical capacity, the sample of facilities in each department was selected with probability proportional to the annual volume of deliveries managed there. In Zou there are a total of six health facilities with surgical capacity and six of these facilities were included in the sample. In Atlantique there are 11 health facilities with surgical capacity, of which six were selected with probability proportional to their annual volume of deliveries. The volume of deliveries varies greatly between strata and within strata. In general, the private facilities without surgical capacity have the lowest volume of deliveries; about 80% of these facilities are handling 10–29 deliveries per month. Approximately 80% of public facilities without surgical capacity and those with surgical capacity manage at least 30 deliveries per month. Two large facilities with surgical capacity in the capital city in Atlantique department manage between 250 and 500 deliveries per month.

## Study Results

Routine data were recorded in a wide variety of registers within each facility; 26 different types of registers were identified during the census of health facilities. In general, private facilities maintained fewer registers than public facilities (on average three versus five registers, respectively). The maximum number of registers maintained in any one facility in the census was 15. For the purposes of this study, four register types containing data relevant to delivery were selected for study in sampled health facilities: the delivery register, the referral register, the register of adverse pregnancy outcomes, and the surgical register, in facilities where this was appropriate. The large majority of the registers consisted of either a notebook with hand-drawn columns or a notebook with free text for each delivery (i.e., hand-written paragraphs covering the requested data).

### How Data Are Recorded

The process by which registers were completed varies greatly by register and by the three categories of health facility. In general, the results in Table 1 show that registers were most frequently completed after the delivery or intervention, were frequently completed by someone other than the person responsible for the delivery or intervention, and in few cases have staff been trained for this task. This is not surprising given that registers were not standardized.

### Completeness of Delivery Register Data

The completeness of data in the delivery registers was assessed via a three-step process. First, an inventory of all variables included in the delivery registers identified during the census was compiled into a checklist. Individual line items in delivery registers in sampled facilities were then compared to this checklist. Following this assessment, data collectors then verified whether or not data were recorded for extant variables in the register. This verification consisted of reviewing the last 10 deliveries recorded in the delivery, referral, and adverse outcome registers. The last 20 cases were reviewed in the surgical register.

Box 1 includes the inventory of variables identified in delivery registers across both departments. Between half and two-thirds of the variables included in this inventory were present in the delivery registers of sampled facilities (see Figure 1). Variables most likely to be missing from the delivery registers included: age of woman, date of admission, hour of admission, gestational age, place of birth (to distinguish facility-based births from births occurring at home followed by a post-delivery referral to a health facility), and APGAR score.

### Box 1. Inventory of Variables Identified in Delivery Registers during the Census of Health Facilities

Hour of Birth	Hour of Admission
Obstetrical Observations	Gestational Age
Place of Birth (Home/Facility)	APGAR
Delivery Mode	Sex of Child
Parity	Birthweight
Date of Admission	Date of Discharge
ID Number	Address
Name	Gravida
Age	Date of Birth

Among existing variables in all four types of register considered for this study, the data are remarkably complete. Data were present for at least 98% of the variables included in the delivery, adverse pregnancy outcome, and surgical registers. Data were 92% complete for variables in the referral register. One should note that completeness was determined by the presence of recorded information in each column or section of the register. Attempts were not made to assess the quality of these data nor to assess how often deliveries go completely unreported in the registers.

**Table 1. Characteristics of the Delivery Registers and the Process for Recording of Data**

	Strata 1: Health Facilities with Surgical Capacity		Strata 2: Public Health Facilities without Surgical Capacity		Strata 3: Private Health Facilities without Surgical Capacity	
	Atlantique N= 6	Zou N= 6	Atlantique N= 9	Zou N=9	Atlantique N=9	Zou N=9
Percent of facilities that kept registers in the delivery room	83	50	33	33	56	44
Percent of facilities with registers that were completed after the delivery/intervention	50	100	78	100	78	89
Percent of facilities with registers that were completed by the person responsible for the delivery/intervention	83	67	67	67	100	56
Percent of facilities with registers for which the person responsible for that register received training in its completion	0	0	44	22	44	44
Percent of facilities with registers for which the person responsible for that register received training	0	0	44	22	44	44
Percent of facilities with registers for which the person responsible for that register received training in school in its completion	0	0	44	11	44	11

*Use of Register Data*

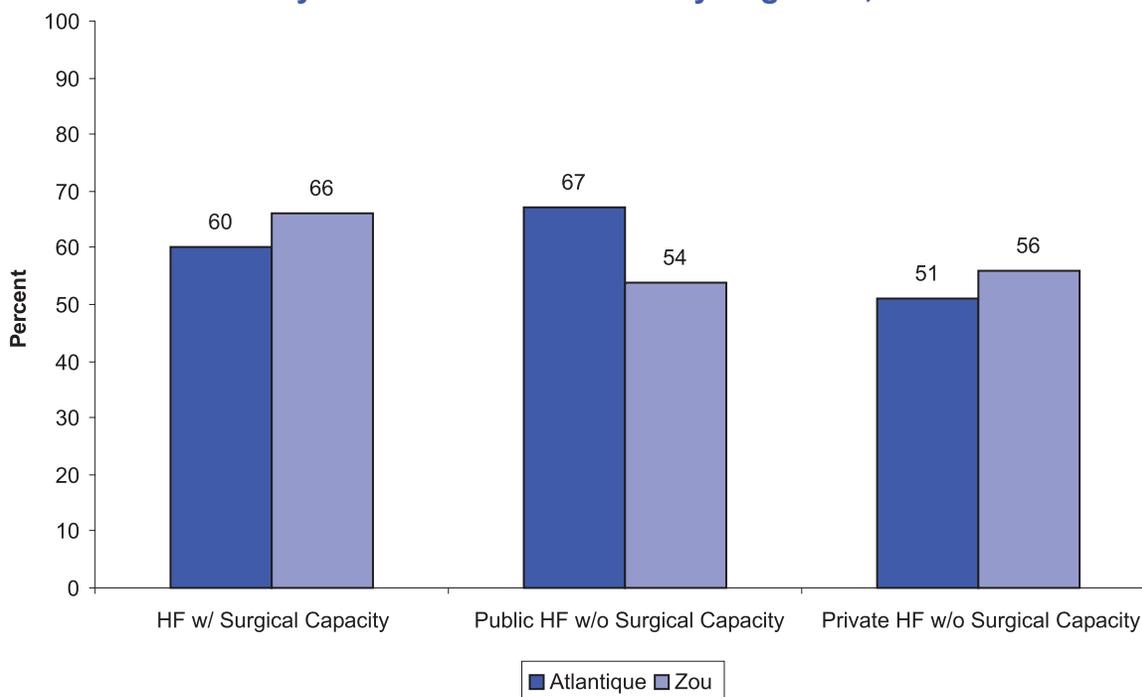
Staff recognized register data as an important tool for immediate decision-making regarding the clinical care of patients. These data were also regularly being used to comply with required reporting for the National Health Information System (SNIGS). Some facilities reported use of these data for planning purposes, although there was no pattern across department or category of facility (use ranged from 22% to 100%). Of facilities with surgical capacity in Zou and Atlantique, 50% and 80%, respectively, reported having received feedback from the Ministry of Health regarding their SNIGS data. None to a third of public and private facilities reported receiving feedback, with particularly low percentages among private facilities. Results from the qualitative study suggested that even when a health facility receives feedback, it was never discussed with midwives or nurses' aids who were responsible for the majority of deliveries.

In the qualitative study, health facility staff also consistently voiced the opinion that they would like to see standardization of the registers and a reduction of the number of registers maintained in each facility.

*Clinical Practices Identified in the Delivery Register*

A number of clinical practices were identified in the delivery registers that are appropriate for the purposes of monitoring and evaluation (i.e., use of oxytocics during labor, episiotomy, referral, and cesarean sections). Figure 2 shows the percent of deliveries in which oxytocics were used during labor and the percent of deliveries which were referred among all deliveries managed during a one to three month period, depending on the volume of deliveries in each facility. Although there are no patterns by department or type of facility, this graph clearly suggests overuse of oxytocics in some health facilities with percentages ranging from 4% to 47% of deliv-

**Figure 1. Coverage of Variables Compared Against the Inventory of all Variables in Delivery Registers, Benin 2002**



eries. Referred cases range from 5% to 26% of deliveries among facilities without surgical capacity.

#### *Validation of Cesarean Section Data*

The purpose of this component of the study was to see if one can rely on delivery registers for monitoring the number of cesarean section operations, as opposed to collecting data from the surgical register as well. The results show that only 82% and 80% of cesarean sections recorded in the surgical register in Atlantique and Zou, respectively, were also recorded in the delivery register of that health facility. Reliance on only one register would result in missing one of five cesarean section operations. Consequently, this practice is not recommended.

#### *Compliance with Referrals*

Only 51% and 63% of cases referred from public and private facilities without surgical capacity in the department of Zou, respectively, were recorded in the delivery or surgical register of the referral hospital. (This component of the study was not conducted in Atlantique.) Additional research would be required to understand the reasons for such non-compliance. It is assumed that women who did not comply with their referral either sought care from a lower-level — possibly traditional — source of health care or returned home with unknown consequences. It is doubtful that families sought care at other facilities offering emergency obstetric care since the referral

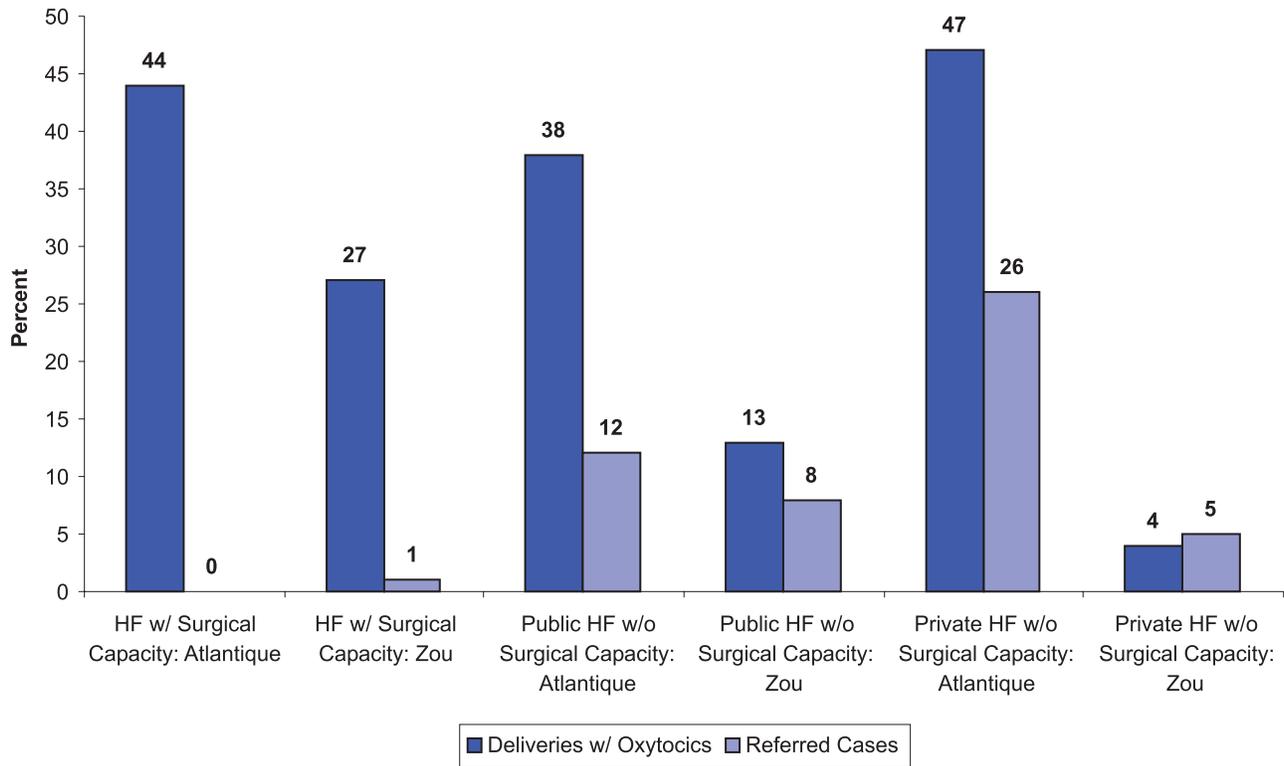
site is selected according to proximity. Although the number of sampled facilities is very small, a review of the compliance with referral on an individual facility basis clearly showed a negative relationship between compliance and distance to the referral site. For some hospitals, no women complied with the referrals.

### **Conclusions**

The Benin Maternity Register Study was designed to assess the current and potential use of data routinely collected from registers and logbooks. The results suggest that although there is very little standardization in the data collected, that which is collected tends to be quite complete. Routine data are being used for immediate decision-making regarding patient care and for reporting to the National Health Information System. In some cases routine data are being used for planning and management purposes at the facility level. However, these data are rarely discussed with facility staff or between staff and supervisors for the purposes of improving processes of care.

Many of the facilities have the data necessary to report monthly or quarterly on a wide range of indicators, including numbers and rates of cesarean section operations, episiotomies, induced deliveries (i.e., use of oxytocics), referrals, and maternal and perinatal deaths. In the case of cesarean section operations, data should be extracted from surgical registers only. Although

**Figure 2. Percent of Deliveries in Which Oxytocics Were Used During Labor and Percent of Referred Cases**



the existing data do not meet the requirements to report on the UNICEF/WHO/UNFPA process indicators of the availability and utilization of emergency obstetric services (i.e., met need for emergency obstetric care or the percent of deliveries taking place in an emergency obstetric care facility), they could provide numerous indicators that can be constructively used for monitoring purposes at the facility level. Initiating use of these data for monitoring and evaluation at the facility level will require staff training and supervision, as there is little evidence of this practice currently in place.



# Increasing The Use of Perinatal Health Information in Latin America and the Caribbean

Claudio Sosa

- » **The Latin American Center for Perinatology (CLAP) Perinatal Information System (SIP) contains about two million records and about 170 variables collected from Perinatal Clinical Record forms from health institutions throughout Latin America.**
- » **Internet-based analysis of these data is now possible through the following websites: <http://www.clap.ops-oms.org> and <http://www.cpc.unc.edu/projects/dapr/da/clap/>**

## Introduction

The Latin American Center for Perinatology (CLAP) maintains a large database of clinical records of pregnant women, deliveries, and newborns from throughout Latin America. This database, the Perinatal Information System (SIP), was developed to promote maternal and child healthcare at health institutions in the region. SIP is based on the Perinatal Clinical Record forms used to guide patient care (Figure 1). The data collected in the forms are entered into a computer record and health institutions in the region send their compiled datasets to CLAP for archiving and analysis (Simini, 1999). Currently, the main database contains about two million records and about 170 variables covering the majority of countries in Latin America and the Caribbean.

The SIP represents a large and valuable data resource for maternal and newborn health care in Latin America and the Caribbean. Since 2000, CLAP has been collaborating with the Distance Advancement of Population Research Project (DAPR) at the Carolina Population Center at the University of North Carolina at Chapel Hill and the MEASURE *Evaluation* project to increase use of this data resource through web-based access to and analysis of the data.

## CLAP and the Perinatal Information System

CLAP was created by the Pan American Health Organization (PAHO) in 1970. Its objective is to improve maternal and

perinatal health in the countries of Latin America and the Caribbean by undertaking clinical research related to maternal, infant, and reproductive health, disseminating research findings, and teaching research methods. Most of the research undertaken by CLAP focuses on improving the health of women and their infants through the evaluation of effective approaches to prevention and treatment and then translating findings into practice. In recent years, CLAP has been working directly with countries in the region to improve critical appraisal of health provider practice in order to increase use of effective interventions and decrease use of ineffective or harmful interventions. The SIP contributes to these efforts by facilitating monitoring of relevant indicators of provider practice.

## Web-Based SIP Data Analysis

The CLAP-DAPR-MEASURE *Evaluation* collaboration first developed a website in Spanish that allows users to analyze 48 SIP datasets from 16 different countries. Users can choose from more than 120 indicators of perinatal health or groups of indicators (Box 1 and Figure 2). Initially, web-based analyses were restricted to basic frequencies of indicators, but more recent developments now allow two-way tabulations and multivariate analysis.

The website address is <http://www.clap.ops-oms.org/>.

### Box 1. Groups of Indicators

10 Basic Indicators  
FIGO Indicators  
Rubella Indicators  
Maternal Morbidity and Mortality  
Neonatal Hospitalization

A website has also been developed that allows similar web-based analyses for the United States. The U.S. data are based on birth registers from 50 states, the District of Columbia, and Puerto Rico. Users select states from a list or a map and then select indicators or interest. The address for this website is <http://www.cpc.unc.edu/projects/dapr/da/clap/isadata1.html>.

## Dissemination of Evidence-Based Perinatal Intervention

Most Latin American countries are characterized by very high rates of obstetrical interventions. For example, the World Health Organization (WHO) suggests that rates of cesarean section should not exceed 15%, yet 12 of 19 Latin America countries exceed this guideline (Belizán, 1999). Similarly, randomized controlled trials have shown that the proportion of vaginal deliveries that require episiotomy should not be more than 30%, yet one study in Latin America found episiotomy rates exceeding 80% in the majority of hospitals studied (Althabe et al., 2002). At the same time, many evidence-based obstetrical interventions are underutilized. There is clearly a need to monitor the use of obstetrical interventions in the region.

A recent component to the CLAP-UNC collaboration has been the design and development of a website to promote evidence-based perinatal practice through improved data use. The new website includes different tools to provide the public health community with access to information on the most common maternal and perinatal health interventions. The site allows users to describe current use of these interventions and provides access to information and recommendations on how to achieve recommended levels of use of different interventions according to an evidence-based medicine bibliography. The first intervention selected for the website was cesarean section. Other interventions will be added to the website in future including episiotomy, vagi-

nal delivery after cesarean section, active management of third stage labor, and labor support.

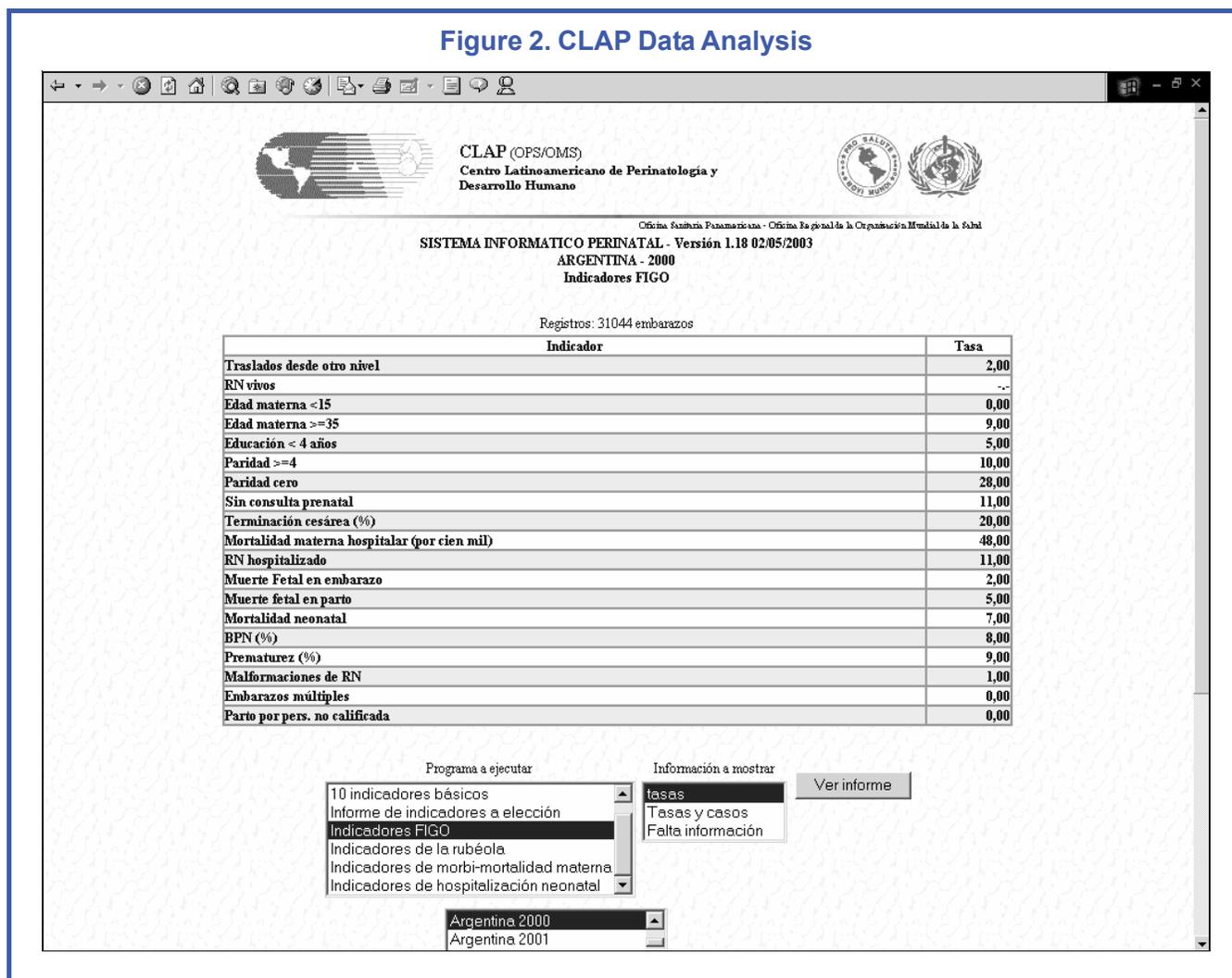
## Cesarean Section Website

The cesarean section website has three main components:

» The *Information Clearing House* site is a repository of resources and information on population-related distance learning and research on cesarean sections designed for clinicians, teachers, and students. The information includes a brief history of the cesarean section, evidence-based in-

**Figure 1. Perinatal Clinical Record**

Figure 2. CLAP Data Analysis



terventions to improve outcomes during treatment, links to the Cochrane Library abstract, patient information and perspectives, recommended cesarean section rates, and guidelines for management of the most important indications for cesarean section. The website can be accessed at <http://www.cpc.unc.edu/projects/dapr/da/clap/csection/ch/index.html>.

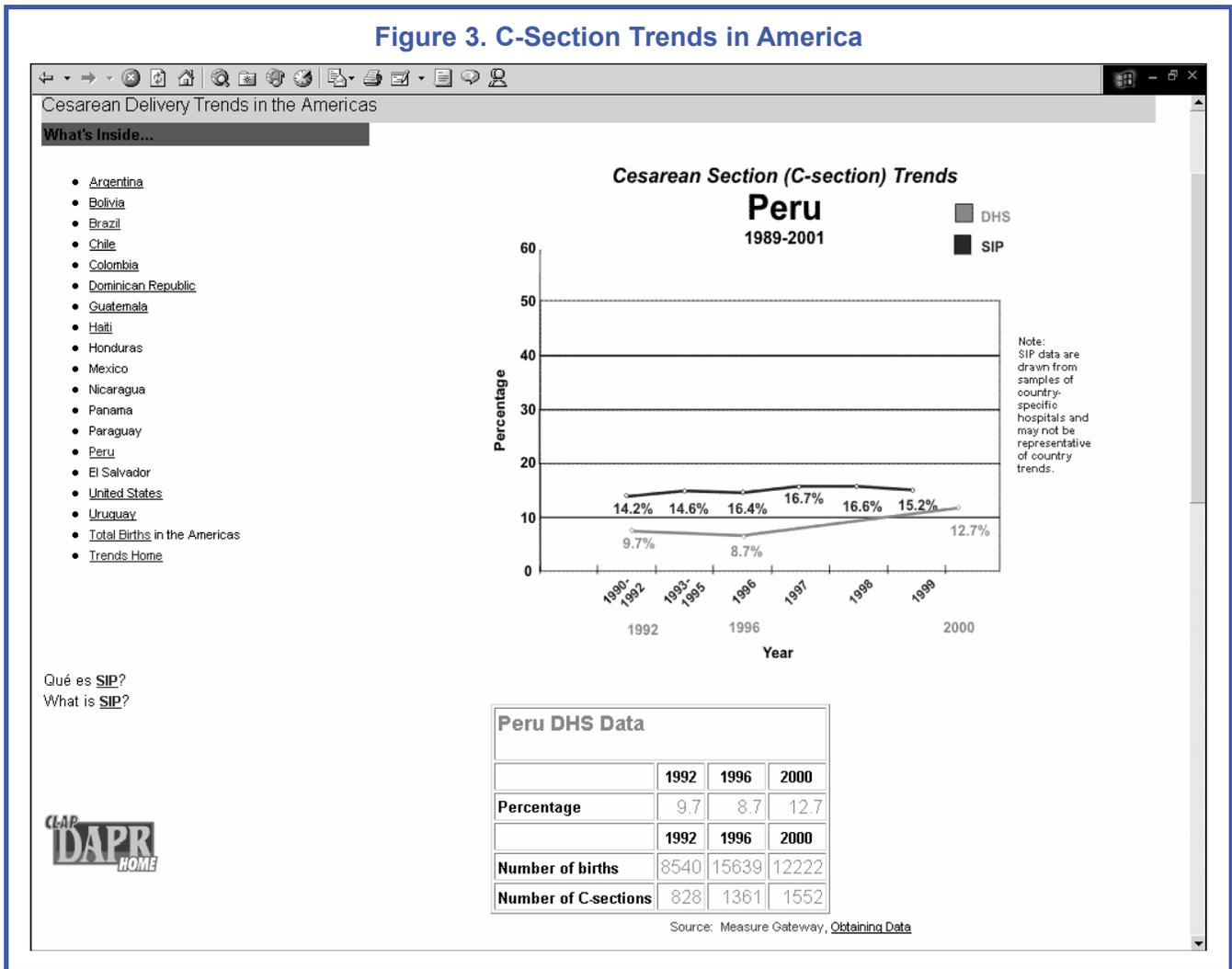
» The *Trends in America* site shows recent trends in cesarean section in many countries of the Americas. The trends are based on data from the SIP database, Demographic and Health Surveys (DHS), Centers for Disease Control and Prevention (CDC), and PAHO. The website contains a list of countries with a link for each country to trends on cesarean section in the last 10 years (Figure 3). This website can be accessed at <http://www.cpc.unc.edu/projects/dapr/da/clap/csection/trends/index.html>.

» The *Distance Analysis Determinants* site is designed to allow users to perform analyses related to determinants of cesarean section. The data for these analyses come from the DHS. Currently, one-way and two-way tabulations can be calculated on the site.

## Conclusion

The CLAP-UNC collaboration through DAPR and MEASURE *Evaluation* has increased access to and use of maternal and perinatal health data by health providers and other users in Latin America and the Caribbean. By highlighting the high levels of use of many obstetrical interventions in the region and providing information on evidence-based practice to reduce these high intervention levels, the project aims to increase use of effective interventions and decrease use of ineffective or harmful interventions.

Figure 3. C-Section Trends in America



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## Websites

Latin American Center for Perinatology  
<http://www.paho.org/clap>

Dynamic website CLAP  
<http://www.clap.ops-oms.org>

Carolina Population Center  
<http://www.cpc.unc.edu/>

Distance Advancement of Population Research  
<http://www.cpc.unc.edu/projects/dapr>

CLAP-UNC Distance Analysis Collaboration  
<http://www.cpc.unc.edu/projects/dapr/da/clap>

Information Clearinghouse  
<http://www.cpc.unc.edu/projects/dapr/ic>

## Measuring Maternal Mortality from a Census

*Cynthia Stanton, John Hobcraft, Kenneth Hill, Nicaise Kodjogbe, W.T. Mapeta, Francis Munene, Moshen Naghavi, Victor Rabeza, Bounthavy Sisouphanthong, and Oona Campbell*

- » **The use of a census-based approach to obtaining maternal mortality ratios was evaluated using data from five countries: Benin, Islamic Republic of Iran, Lao People's Democratic Republic, Madagascar, and Zimbabwe.**
- » **Standard demographic methods were used to evaluate the completeness of reporting of adult births and deaths in the year prior to the census. Results were used to adjust the census data.**
- » **With careful review and adjustment of the data, the census-based approach is a promising methodology for measuring maternal mortality that yields quite plausible estimates.**

### Introduction

Maternal mortality is the health indicator with the greatest disparity between rich and poor countries. Maternal mortality ratios are often 100 times greater in developing countries compared to developed countries. Heightened attention given to maternal health has increased the demand for measures of maternal mortality at both national and sub-national levels. Yet methods for measuring maternal mortality lag far behind demand for data. In developed countries data come from civil registration, but in most developing countries civil registration is too incomplete to be used for such purposes. Using surveys to obtain maternal mortality is also problematic because maternal mortality is a relatively rare event and thus large sample sizes are required. Even surveys with large sample sizes (5,000–15,000) generate estimates with wide confidence intervals. Other limitations are that survey-based methods only provide national-level estimates, do not provide information on differentials in maternal mortality, and can only give estimates that cover periods of seven or more years. This paper evaluates an alternative method that is not yet commonly used: the use of national population census as a means of measuring maternal mortality.

### Census-Based Measurements

#### *Advantages*

The methodology of obtaining maternal mortality ratios from a census meets all of the criteria deemed necessary for estimating maternal mortality, which are presented in Box 1. To

estimate maternal mortality, questions for the identification of maternal deaths can be added to a high quality decennial census that already includes questions on deaths in the household in the previous one to two years. Such a census is able to produce current national and sub-national estimates of maternal mortality as well as differentials.

Existing literature on the direct estimation of adult mortality from census data suggests that questions about recent deaths often are not useful because a high percentage of deaths are omitted. This could be partly due to the breakup of households after the death of a parent. This article evaluates the experience of countries that have used the census-based approach to estimate maternal mortality ratios and makes recommendations for future use of the method. The census-based approach to measurement of maternal mortality is endorsed by the 1999 ICPD+5 Programme of Action, which calls upon the United Nations and donors to support developing countries in undertaking censuses and surveys and to develop innovative and cost-effective solutions for improving estimates of maternal mortality.

The maternal mortality ratio relates the number of maternal deaths in a particular time period to the number of births in the same time period. In order to calculate the maternal mortality ratio from a census, data must be collected on household births and deaths by age and sex. The census must include questions to determine whether deaths to women of reproductive age were due to maternal causes. Evaluation of a

### Box 1. Attributes of an Ideal Methodology for Estimating Maternal Mortality

- » The method should be capable of producing acceptably precise estimates at the national level, as well as producing differentials in maternal mortality by region, urban or rural residence, age, and other characteristics of interest.
- » The method should be capable of producing multiple indicators of maternal mortality (i.e., in addition to the maternal mortality ratio, the method should also generate the maternal mortality rate, the proportion of adult female deaths due to maternal causes, and lifetime risk of maternal death).
- » Maternal mortality data should be collected by an institution other than those responsible for implementation of maternal health programs.
- » A practical method for maternal mortality measurement need only generate estimates approximately once every 10 years to provide information on long-term trends.

census as a means of estimating maternal mortality ratios requires evaluation of the completeness of the recording of adult female deaths, the adequacy of the approach used to identify maternal deaths, and the completeness of data on births.

It should be noted that a census would generally include questions about pregnancy-related deaths and not strictly maternal deaths. A true maternal death requires cause of death information while a pregnancy-related death is determined by the timing of death relative to pregnancy, childbirth, and the postpartum period. Even though some pregnancy-related deaths are due to conditions or accidents not related to the pregnancy itself, both pregnancy-related deaths and true maternal deaths tend to be reported as maternal deaths.

#### *Census Data*

Census data from five countries (Benin, Islamic Republic of Iran, Lao People's Democratic Republic, Madagascar, and Zimbabwe) that included maternal mortality data in their most recent censuses were evaluated. The characteristics of these censuses varied considerably from length of training of the enumerators to methods and questions used.

#### *Completeness of Reporting*

Standard evaluation methods were used to assess the completeness of reporting of female births and death. The general growth balance technique was used to compare reported deaths to mortality information encapsulated in the census age distribution. (An assumption of this method is that net migration equals zero.) The method makes use of the fact that for any population the entry rate into the population minus the growth rate must equal the exit rate. Systematic differences between the entry rate and the growth rate against the exit rate imply an inconsistency between the reporting of population and the reporting of deaths. The magnitude of that inconsistency can be interpreted as a measure of completeness

of reporting of deaths compared to reporting of population and can be used to adjust the mortality estimates.

Two methods were used to evaluate the data on births. Reverse projection was used to estimate the number of births from the number of young children (0–4 years) in the population after allowing for the risks of childhood death. Reverse projection requires the age distribution of the population and some basis for estimating mortality risks for children under the age of 5 years. In this evaluation, child mortality was estimated from numbers of children ever born and children surviving by age of the mother, which was obtained from the census.

The second technique is the P/F ratio method which compares average parity to cumulated current fertility. This method involves comparing data on births by age of the mother in the year before the census with data on the average numbers of children ever born by women in each age group. The technique relies upon the equivalence of lifetime fertility and cumulated age-specific fertility rates. If the cumulated age specific fertility rates are systematically lower than the average numbers of children ever born, then births in the 12 months preceding the census are likely underreported. In situations where fertility is changing (when current fertility is not equal to lifetime fertility) conclusions should be drawn with caution.

Currently there are no demographic methods for evaluating the identification of maternal deaths. The evaluation presented in this paper relied upon an assessment of the plausibility of age patterns of maternal mortality and a comparison of census results to external sources of data when available. Comparisons were also made to empirical regularities, such as an expected “J” shape in the maternal mortality ratio by age or an inverted “J” shape for the proportion of deaths of women of reproductive age that were due to maternal causes.

**Table 1. Unadjusted and Adjusted Maternal Mortality Ratios from the Five Countries**

	Benin	Islamic Republic of Iran	Lao People's Democratic Republic	Madagascar	Zimbabwe
<b>Unadjusted MM Ratio</b>	168	39	821	NA	395
<b>Adjustment Factor</b>					
Births	1.34	1.30	1.65	1.00	1.00
Deaths	2.7	3.0	1.6	2.5	1.0
<b>Adjusted MM Ratio</b>	338	88	796	NA	395
<b>High Variant</b>	250	58	746	NA	None
<b>Low Variant</b>	375	95	871	NA	None
<b>MM Ratio for External Sources of Data</b>	498	NA	NA	NA	393

### *Estimates of the Maternal Mortality Ratio*

Using the techniques presented in the previous section, adjustment factors were calculated and applied to female deaths and births. Four of the five countries required upward adjustments for deaths, and three of the five countries required upward adjustments for births. The number of maternal deaths was increased by the same factor as that used for adult female deaths on the assumption that the proportion of adult female deaths due to maternal causes was correct. Each of the evaluation techniques described in the previous section yielded two or three possible adjustment factors. Preferred adjustments were selected after review of the results and consideration of the demographic conditions of the country. For example, fertility has fallen rapidly in both Iran and Zimbabwe, so the adjustment factor from the P/F method was not used. Although the adjustment factors were often large, the evaluation techniques were deemed, based on their internal patterns, to have worked well enough to give reasonably precise estimates, though it should be noted that no standard significance tests can be applied to these results. Adjusted maternal mortality ratios were 338 for Benin, 88 for the Islamic Republic of Iran, 796 for the Lao People's Democratic Republic, and 395 for Zimbabwe. The maternal mortality ratio could not be calculated for Madagascar because there was no information concerning maternal age at death. The unadjusted and adjusted maternal mortality ratios as well as the adjustment factors are presented in Table 1.

### **Conclusions**

With careful evaluation and adjustment, census data can provide estimates of maternal mortality ratios. Based upon the evaluation presented in this paper, recommendations for governments considering maternal mortality measurement were made concerning types of questions to include in the census

and the need for careful field testing and training of field-based supervisors. The United Nations already recommends that developing countries include questions on births and deaths in their censuses. Only one or two additional questions are required to calculate maternal mortality ratios. Comparisons of estimates obtained from censuses to surveys have yielded similar results, and census-based methods have the advantages of allowing for sub-national estimates and information on differentials.

Based on this evaluation of the use of census data to measure maternal mortality MEASURE *Evaluation* and WHO published guidelines for measuring maternal mortality in a census, which described the methodology in more detail (Hill, Stanton, and Gupta, 2001). A workshop was also held in Peru to explore the use of the method in upcoming censuses in Latin America (Measuring Maternal Mortality from a Census, 2001).

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# Maternity Care: A Comparative Report on the Availability and Use of Maternity Services

Data from the Demographic and Health Surveys Women's  
Module & Services Availability Module, 1993–1996

*Mandy Rose, Nouredine Abderrahim,  
Cynthia Stanton, and Darrin Helsel*

- » **Maternal healthcare utilization has been studied extensively from the user point of view. Distance to available services has been correlated with low utilization.**
- » **This report examines distance and other factors by using a new methodology to mark the geographic distance to available services for 10 countries on three continents, based on both community report and facility-based surveys.**
- » **Longer travel times or farther distances to services was independently associated with lower utilization for all types of maternal health services, including family planning, for all countries. There were marked differences in utilization rates based on urban and rural residence within countries.**
- » **The proximity of maternal health services to users is critical to increasing utilization and thus preventing maternal mortality and morbidity.**

## Introduction

The Safe Motherhood technical consultation in Colombo, Sri Lanka in 1997 established priorities for reducing maternal mortality and improving maternal health over the next 10 years. Of the 10 action messages endorsed, one of the most critical was the need to improve women's access to good quality maternal health services. A further challenge and action message identified was the need to develop tools and methods for measuring progress and assessing the impact of Safe Motherhood programs.

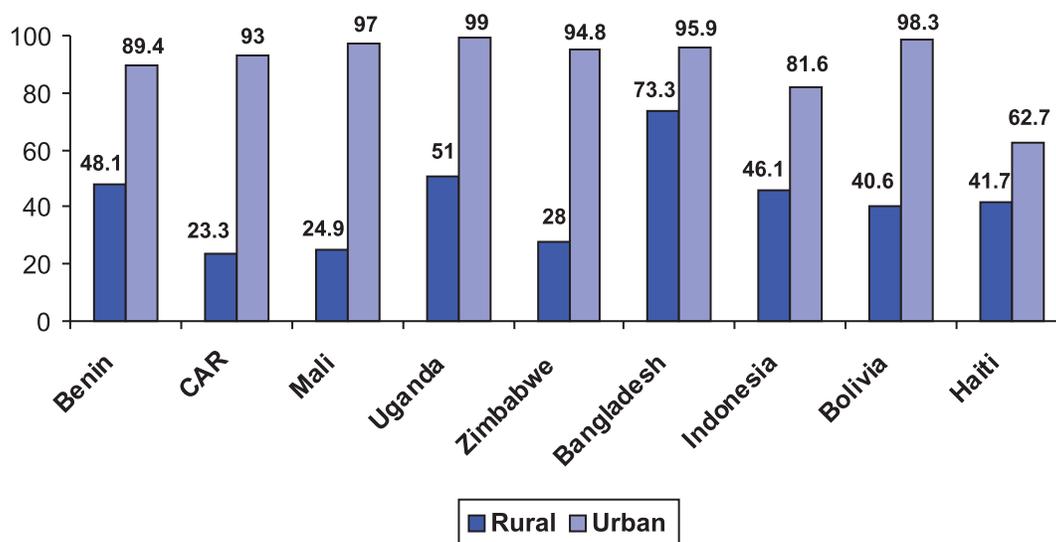
Using data from the Services Availability Module (SAM) and women's questionnaires from the DHS III surveys implemented between 1993 and 1996/7, the Comparative Report described women's access to maternal health care and family planning services in 10 countries. These countries include Benin, Central African Republic (CAR), Mali, Uganda, Zimbabwe, Bangladesh, the Philippines, Indonesia, Bolivia, and Haiti.

The report aimed to describe the availability of maternal health services and family planning services, compare the availability of services and utilization across countries, and determine whether availability is associated with reported utilization.

## Background

Most of the evidence in support of the role that distance plays in influencing health care utilization has been derived from family planning studies. Recent studies have shown that distance is only one among many factors that determines the choice of healthcare provider and that its effect is shaped by a complex interaction of social, economic and cultural factors and perceived quality of care (Bertrand et al., 1995; Egunjobi, 1983). Undoubtedly, distance plays an important role in maternal healthcare use, but the effects may differ from family planning services, since the motivations of pregnant women vary fundamentally from those women wanting contraceptive services (Prevention of Maternal Mortality Network, 1992). Moreover, the effect of distance is likely to vary according to whether the care sought is for a planned event such as antenatal care or for an unscheduled event, such as

**Figure 1. Percent Distribution of Currently Married Women Aged 15–49 Who Live Within 5 km. of any Facility by Rural/Urban Residence**



the onset of an emergency condition. Relatively few studies have examined the very special circumstances that are likely to prevail around the time of delivery. For example, the unpredictable onset of labor, its unknown duration (which will affect the assessment of perceived benefit of reaching care with the risk of delivering on route), and the physical difficulties of traveling when laboring will all have an important impact on women's access to care. Overall, the studies of the determinants of maternal mortality and maternal care seeking behavior reviewed (Thaddeus and Maine, 1994; Prevention of Maternal Mortality Network, 1992) suggest that distance exerts a measurable effect on health services use, but that the strength of this association varies.

## Methods

Service availability was defined by geographic proximity to services as measured by reported distance or travel time to a facility. The DHS SAM survey methodology used key informants to provide information on the nearest facility of a certain type to each DHS cluster, allowing the availability of services to be assessed for a representative sample of women. The SAM is comprised of a community-level survey and a facility survey. In many cases, only the community survey was conducted. The community survey contains interviews with three or four knowledgeable residents from each DHS cluster, at least one of whom must be female. General information is collected about the community such as the relative location of the cluster (i.e., distance to the nearest town, the main means of access), as well as information about community infrastructure and the availability of local services. The facility survey is conducted with the nearest facility of each

type mentioned in the community survey to validate the information collected in the latter. These visits are limited to facilities within a 30-km. radius of the DHS cluster. The limitation of the SAM is that the survey is designed to collect relevant information on the nearest facility of each type. Also, no information is collected on the provision of care from the informal or traditional health sector.

## Results

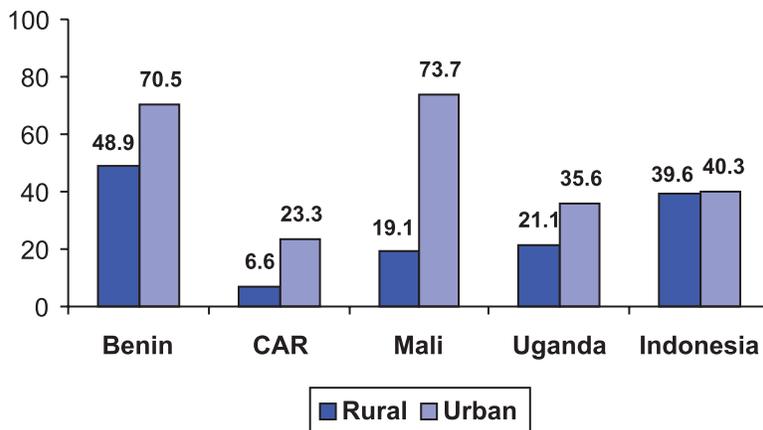
### *Availability of Care*

In most countries, the majority of urban women lived within 5 km. of some type of health facility; the figures for rural women were much lower, ranging from only 25% of women in some countries to 65% in others (Figure 1). The distances to facilities offering maternal health care varied from 2 km. in Indonesia to 8 km. in Mali. Once again, there were very wide disparities between rural and urban areas. These differences persisted within and across countries. Figure 2 shows the proportion of currently married women living within a DHS cluster in which a trained midwife was available. The rural-urban differentials were sharpest in Mali and indistinct in Indonesia. Yet, a much larger number (74%) of urban women in Mali had close access to a trained midwife than urban women in Indonesia (40%).

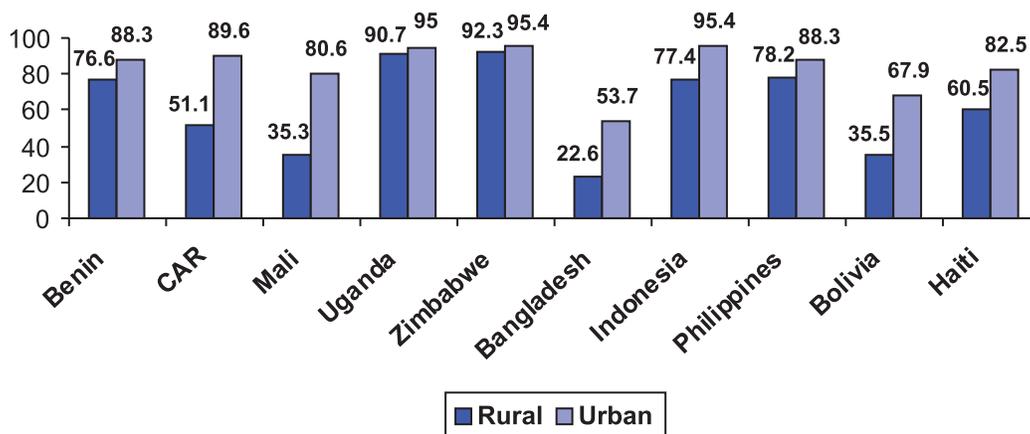
### *Antenatal Care*

As expected, antenatal care (ANC) coverage varied widely among countries (Figure 3). During their last pregnancy, more than 75% of women made an ANC visit with a skilled provider in Benin, Indonesia, and the Philippines, contrasting with 90% of women in Uganda and Zimbabwe. Patterns of care

**Figure 2. Percent of Currently Married Women Aged 15–49 Living in Clusters Where There is a Trained Midwife (TMW), by Rural/Urban Residence**



**Figure 3. Percentage of All Births 3–5 Years Before the Survey for Whom Women Report Receiving Antenatal Care From a Skilled Provider, by Rural/Urban Residence**



varied among countries, with midwifery-based care being the norm in Africa and Indonesia, and doctors providing most ANC care in Bangladesh, Haiti, Bolivia, and the Philippines. Distance was associated with ANC attendance in rural areas: women living further away were more likely to attend later or not at all than were women living closer. This relationship was strongest in the francophone countries and Indonesia. In most countries, women who go for ANC live closer to the health facility offering such care than those who do not attend, and women who attend most often live the closest.

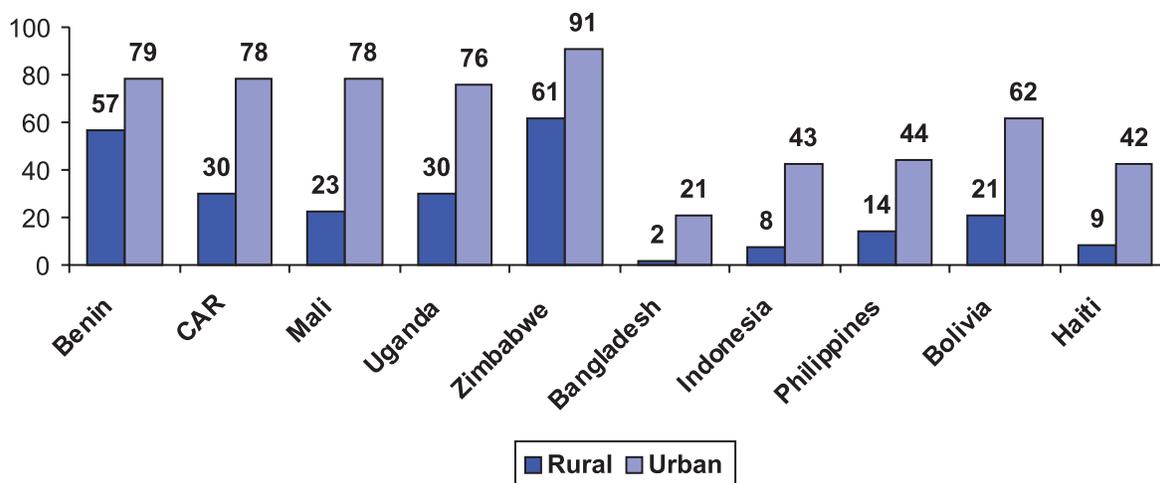
#### *Delivery Care*

Figure 4 shows the differences in the use of delivery care among countries and within countries based on urban and rural residence. In most countries, the majority of births take place at home, but in some countries, such as Benin and Zimbabwe, the majority take place in a health facility. Women

in Bangladesh were the least likely to deliver in a facility. Most women (66% to 91%) in urban areas of all countries, except Bangladesh, delivered with a trained birth attendant. In Bangladesh, only 35% of urban women delivered their last child with a skilled attendant. In contrast, the vast majority of rural women did not deliver with a skilled attendant (ranging from 6% in Bangladesh to 36% in the Philippines) in all countries other than Zimbabwe and Benin, which were 62% and 57%, respectively.

While the majority of women receive ANC, a minority deliver with a skilled attendant; contraceptive practice varies widely among countries. However, there are wide variations between urban rural populations, highlighting the fact that many women, particularly in rural areas, lack access to services at every stage of their pregnancy. In urban areas, at least 80% of women live within 5 km. of a facility and travel times

**Figure 4. Percentage of All Births Delivered in a Health Facility, by Urban/Rural Residence**



to services are only 10–15 minutes, but in rural areas less than half the population live within 5 km. of the nearest facility and travel times are on average up to 90 minutes.

#### *Delivery Choices and the Influence of Distance and Time*

In every country, women who live nearer to a health facility are more likely to give birth in a facility. The median distance that women live from a facility is shorter for those with facility-based births versus others. For example, in Benin, women with facility-based births lived twice as close to a facility than those who delivered elsewhere. As shown in many other studies, education had a strong positive effect on the likelihood of women delivering in a facility versus home, but even after controlling for education, distance clearly influenced the probability of women delivering in a facility. In every country, women living further than 5 km. from a facility were between 25% and 75% less likely to have a facility-based delivery than those who lived within 5 km.

#### *Emergency Care*

With the exception of the Philippines, very few rural women had access to a hospital within 10 km., ranging from 3% of women in Mali to 42% of women in Haiti. Although access to care is much better in urban than rural areas (Figure 5), between 10% and 40% of urban women live more than 10 km. from a hospital. Although the proportions of women who live within one hour of a hospital are marginally higher than those who live within 10 km., the fact remains that for many women in these 10 countries, there are essentially few emergency services available.

#### *Family Planning Services*

Other than Zimbabwe, where almost half the married female population reported using contraception, rates of contracep-

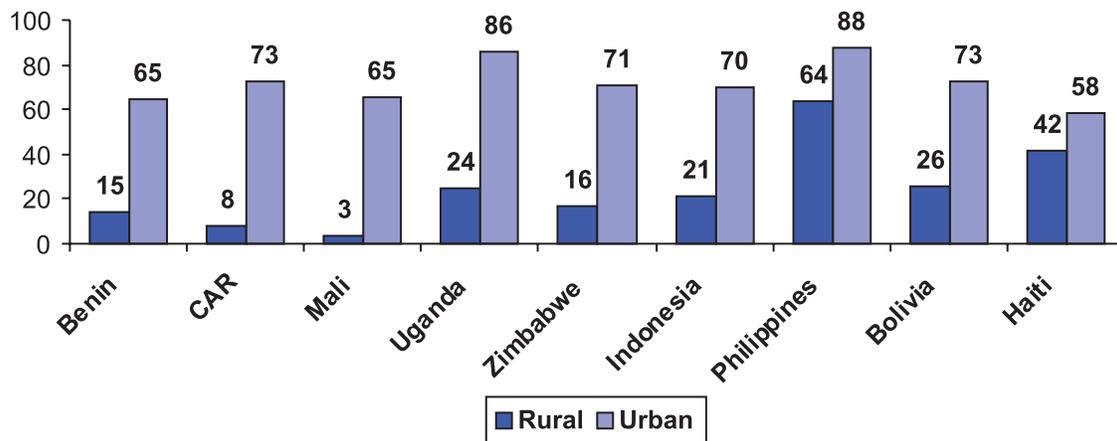
tive use were much higher in the non-African countries. In these countries, modern methods accounted for the greatest proportion of use, except in Bolivia, where traditional methods were the most popular method (25% of women). Traditional methods were also the contraceptive method of choice in Benin, CAR, and Uganda. By comparison, modern methods of contraception were used almost exclusively in Indonesia, and in Mali few women used contraception of any type.

## Conclusions

Although the capacity to draw conclusions based on region is limited since the report analyzes only 10 countries, differing patterns, both in the provision and use of services, are seen among the Africa, Asia, and LAC regions. Women in the African countries represented in these analyses are more likely to use services and deliver with a skilled attendant than in the other countries. In the Asian countries, fewer women deliver with a skilled attendant and many more deliver at home. This is despite the fact that women in Asia and LAC countries sampled may live closer to services. Also, in the African countries, maternal health care is delivered by midwives, whereas in the remaining countries, doctors provide the majority of care.

While the main findings are to be expected, they have rarely been quantified and used for targeting program interventions. Twice as many urban than rural women, for example, live within 5 km. of any facility and two to three times as many urban women live within 10 km. of a hospital or 5 km. of a delivery facility. In Mali, where over a third of the rural population live beyond 15 km. from the nearest delivery facility, four times as many urban than rural women live within 5 km. of a delivery facility as rural women. Indeed, in terms of ser-

**Figure 5. Percent of Currently Married Women Aged 15-49 Who Live Within 10 km of a Hospital, by Rural/Urban Residence**



vices availability, urban populations in different countries are more alike than are urban and rural areas within the same country.

Importantly, the report also shows that the availability of maternal health services is consistently associated with greater use in every type of service considered. Rural women who live nearer health services are not only more likely to seek antenatal care more frequently and earlier in the pregnancy, but are also more likely to deliver at a health facility, use a skilled attendant, and use a modern method of contraception. In addition, the report also demonstrates that distance is a greater disincentive to seeking care at the time of delivery than at other times during pregnancy.

The findings of the report have a number of policy implications. First, low services availability is still a major barrier to care in many countries, even in those countries whose national estimates suggest relatively high service coverage. Many rural women live in areas where the physical terrain and the distances involved when seeking care mean that services are effectively unavailable. Although improving service quality is an important consideration, for these women, the priority must be to increase service coverage. Secondly, in order to improve program management, countries and agencies reporting health services data should be encouraged to stratify their indicators by appropriate differentials. Stratification would have two principle purposes. Programs could target scarce resources to those most in need and the stratification would permit some monitoring of whether health programs have an impact on increasing or decreasing equity between subgroups. Unless this is done, programs designed to improve access may appear to be achieving progress, but in fact may only be serving to increase inequity. For example, a program aimed at

increasing delivery with a skilled attendant may appear to increase access when national data only are considered, but in fact achieve its effect by raising provision in only the more programmatically accessible urban areas.

Although the SAM has many limitations, in the context of a DHS survey, the method provides a cost-effective approach for monitoring women's access to services. As with any indicator, the findings cannot be used in isolation and should be triangulated with information from other sources to draw valid and meaningful conclusions. Few tools exist to measure services access. Despite the inherent assumptions and limitations of the method, the Services Availability Module is a cost-effective approach for obtaining information about proximity to services in countries where DHS surveys are being implemented. In the context of the difficulties that monitoring maternal health presents and the clear need to increase service coverage, the potential contribution of the SAM for providing data on access to health services should be reassessed. Potential contributors to this discussion should be experts involved in the development of tools and methods for monitoring maternal health, as well as those experienced in the SAM methodology.

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# Evaluation of Midwifery Care: A Case Study of Rural Guatemala

*Noreen Goldman and Dana Gleit*

- » Training programs for traditional birth attendants (TBAs) in developing countries have been part of the effort to address high maternal mortality rates, but few systematic evaluations of these programs exist.
- » Guatemala, with some of the highest maternal and infant mortality rates in Latin America, has a long established TBA training program. The effectiveness of this program has been questioned.
- » Using the 1995 Guatemalan Survey of Family Health, several aspects of pregnancy-related care in Guatemala were described and evaluated.
- » Results indicate that for this sample, the effects of training have been mixed; there was little or no observed change to harmful midwifery practices, but trained TBAs were much more likely to refer pregnant and birthing women for biomedical care.

## Introduction

About half the births in developing countries are attended by a person without professional training (WHO, 1997). In the early 1970s, the World Health Organization began to promote the integration of TBAs within formal maternity care systems, encouraging countries to offer training programs (Leedam, 1985). The Guatemalan government has an early history of integrating midwifery services into the formal health system, with 70% of the approximately 20,000 TBAs having received training during the 1980s (Putney and Smith, 1989). The quality of these training programs has been questioned (Cosminsky, 1982; Greenberg, 1982; Lang and Elkin, 1997), and there is little information on the quality of maternal health care delivered by both TBAs and the biomedical system in Guatemala. This study described and evaluated several aspects of pregnancy-related care in Guatemala, using a large-scale sample survey—the 1995 *Encuesta Guatemalteca de Salud Familiar* (EGSF) or the Guatemalan Survey of Family Health (GSFH).

## Social and Health Context of Guatemala

Guatemala is one of the poorest countries in Latin America and is characterized by some of the highest maternal and infant mortality rates in the region. Recent estimates show a maternal mortality ratio of 190 maternal deaths per 100,000 live births and an infant mortality rate of 43 infant deaths per 1,000 live births (World Bank, 1999). The health care system in Guatemala is comprised of traditional, biomedical, and popular practitioners. Pregnancy-related care in Guatemala is most commonly provided by TBAs, who are typically highly respected within their communities. Pregnant women have increasingly sought biomedical care at government and private facilities, while often continuing to visit a TBA. Overall, Guatemala has the institutional capacity to provide formal medical services for only 20% of birthing women (Schieber and Delgado, 1993).

Training programs for TBAs in Guatemala began in 1955; untrained TBAs are legally prohibited from practicing (Greenberg, 1982) but continue to do so. The current 15-day program is carried out by the Ministry of Health and taught by a nurse with at least one year of nursing education. Additional training may be available for TBAs who have received

the basic course (Lang and Elkin, 1997). Nongovernmental and international agencies have also conducted training programs. Noted problems with the training programs are that they are inappropriate for illiterate women and are taught by inadequately prepared trainers who are unable to speak indigenous languages and are condescending toward TBAs. There have also been problems with teaching procedures that are impractical for the TBAs' environment.

## Methods

The study investigated several areas of pregnancy-related care in Guatemala. The extent to which women combine biomedical and traditional care from a TBA was described, along with the degree to which TBAs report that they refer pregnant women to other providers. Differences between trained and untrained TBAs were compared, and characteristics of the TBA and the community associated with the likelihood of patient referral to the biomedical healthcare system were identified. The content of pregnancy-related care provided by TBAs was examined. Midwives' practices were described with a focus on those considered either beneficial or harmful according to current scientific evidence. A quality of care index based on these practices was developed. Finally, trained and untrained TBAs were compared to assess who provided better care based on this index.

## Data

A total of 2,872 women aged 18 to 35 residing in 60 small rural communities were interviewed in the 1995 EGSF. Approximately 50 women were administered questionnaires in 15 communities in each of four departments of Guatemala, which were selected on the basis of social, economic, environmental diversity, and ethnic composition. Communities were selected with probability proportional to population size methods. Pregnancy-related care and complications were recorded for each of the last two live births that occurred since January 1990—a total of 3,350 births to 2,020 women. The overall non-response rate was 11%.

Three community informants (the mayor, a woman in a leadership position, and another person not in a leadership position but who knew the community well) provided information about the community and a listing of health providers and facilities within a 20-km radius of the community. These listings were consolidated to construct a census of health providers and facilities for each community (see Peterson et al., 1997 for details). Subsequently, five types of providers were randomly selected for interview: the person in charge of the health center or post nearest the community, a private doctor, a TBA, and two other providers, including other traditional practitioners such as curers and others. As part of the provider survey, 66 TBAs were interviewed.

## Analyses

Multivariate analyses were used to assess the impact of the training status of TBAs on the likelihood of referring women to a biomedical provider and the quality of TBA care. The quality of care measure was derived from an assessment of the potential benefit or harm of the practices reported by TBAs. Practices that could not be assessed were not included in the measure. In total, 10 practices were identified that were likely to be harmful or beneficial. The potentially harmful practices were: ever giving an injection to speed delivery, ever giving antibiotics during pregnancy or delivery, ever putting powder or ointment on the umbilical cord, normally pushing on the stomach at the beginning of delivery, normally performing a vaginal examination during pregnancy, and normally telling the mother to give the baby sugar water or tea in the first week of life. The remaining four items were considered beneficial: keeping the baby warm after birth, encouraging breastfeeding, encouraging immunization, and checking the mother and baby during the postpartum period. These 10 practices were scored such that higher values reflect a greater potential harm. The resulting quality of care index ranged from 0 (high quality) to 10 (low quality).

## Results

### *Availability of Care*

All communities had a TBA within one hour's travel time. Biomedical services were less accessible; only 40% of communities had a health center or post and 20% had a private physician serving pregnant women. About half the communities had a private doctor within one hour's travel time. Hospitals were even less accessible. Costs varied widely by type of care. The charges for care provided by doctors were about 10 times as high as for TBAs.

Table 1 presents the characteristics of the 66 TBAs interviewed in the EGSF provider survey. About three-fourths of the TBAs in these communities attended a training course related to midwifery, pregnancy, or birth. Relatively few had formal training and most (70%) had no schooling. TBAs' work is generally not full-time; during the week prior to the survey, TBAs spent an average of only 10 hours treating pregnant women or sick patients.

### *Patterns of Care during Pregnancy and Birth*

On average, when women combined care during pregnancy, they visited a health center or post 4.5 times, and a TBA 6.4 times. Estimates derived from the sample of births indicated that women who see a provider during pregnancy make an average of eight prenatal visits. Table 2 presents the type of care sought for the 3,350 births captured by the survey. In almost all pregnancies (96%), women obtain some form of prenatal care. The TBA is the most frequently sought pro-

**Table 1. Characteristics of TBAs**

<b>Formal Training</b>	
Attended Course for TBAs or Related to Pregnancy/Delivery (%)	75.8
Attended Some Other Course <sup>a</sup> (%)	15.2
Has Not Attended Any Course (%)	9.1
<b>How Learned to Attend Pregnant Women</b>	
Experience/Necessity (%)	37.9
Divine Calling (%)	36.4
Course or Practicum (%)	15.1
Apprenticeship (%)	9.1
<b>Formal Education</b>	
Any Formal Schooling (%)	30.3
Mean Number Years Schooling Among Those with Any Schooling	3.6
<b>Ethnicity and Language Ability</b>	
Ladino/Speaks Spanish (%)	35.4
Indigenous/Speaks Both Spanish and Maya Language (%)	38.5
Indigenous/Speaks Only Maya (%)	15.4
Indigenous Speaks Only Spanish (%)	10.8
<b>Provider Roles</b>	
TBA Only (%)	65.2
TBA/Curer (%)	18.2
TBA/Curer/Other <sup>b</sup> (%)	7.6
TBA/Other <sup>b</sup> (%)	9.1
<b>Majority of Clients are:</b>	
Relatives (%)	1.5
Not Relatives (%)	86.4
Half and Half (%)	12.1
Hours Spent Treating Pregnancy Women and Sick People in Past 7 Days (mean)	10.2
Number Deliveries in Past 2 Weeks (mean)	2.2
<b>Number of TBAs</b>	<b>66</b>

<sup>a</sup>Other courses included: postpartum baby care, maternal and child health courses, APROFAM (family planning) courses, auxiliary nursing, health promoter, dehydration and prevention of illness, community health, and personal hygiene and importance of vaccination

<sup>b</sup>Other roles include herbalist, bonesetter, masseuse, injectionist, nurse, and health promoter.  
Source: Midwife interviews in the EGSF (1995)

vider at all stages of pregnancy and at birth, with most deliveries (85%) occurring at home. The most common pattern for prenatal care was seeing a TBA exclusively (56%), followed by combining visits with a TBA and a biomedical provider (28%). Biomedical providers alone were seen in only 11% of the cases. The majority of births (80%) were attended by a TBA; doctors only attended 11% of all births and 4% had no attendant. During the postpartum period, no women combined care types, and for almost one-third of births (29%), women did not see any provider.

#### *TBA Referrals*

Overall, 80% of TBAs indicated that they made referrals to another provider for prenatal care or for problems during preg-

nancy; one-third of TBAs made referrals on a regular basis. TBAs most often referred to the health center or post during the prenatal period and to the hospital for problems during birth. Trained TBAs were more likely to refer patients for biomedical care, even after controlling for other factors.

Estimated odds ratios from a logistic regression model of the likelihood of frequent referral for biomedical care during pregnancy or birth are shown in Table 3. The model controlled for the department of residence, the presence of a biomedical provider in the community, regular bus transportation, and the average household consumption per capita of the respondents living in the community. TBA training had a large and significant effect on referral practices, with the estimated odds

**Table 2. Care During Pregnancy, Delivery, and the Postpartum Period**

<b>Providers Seen During Pregnancy</b>	<b>%</b>
No provider <sup>a</sup>	4.2
<b>Traditional Only</b>	
TBA	56.3
<b>Combined Care</b>	
TBA & Health Center or Post (HCP)	18.6
TBA & Doctor/Nurse	7.8
TBA, HCP, and Doctor/Nurse	1.7
<b>Biomedical Only</b>	
HCP	5.3
Doctor/Nurse and HCP	0.6
Doctor/Nurse	5.5
<b>Place of Delivery</b>	
Home <sup>b</sup>	85.4
Hospital/Clinic/HCP <sup>c</sup>	14.3
Other	0.3
<b>Birth Attendant</b>	
TBA	80.9
Doctor	11.1
Nurse	3.5
HCP Staff	0.9
Other/No Attendant	3.6
<b>Providers Mother Saw During Postpartum Period</b>	
No Provider <sup>a</sup>	28.9
<b>Traditional Only</b>	
TBA	59.3
<b>Combined Care</b>	
TBA & Health Center or Post (HCP)	0.6
TBA & Doctor/Nurse	0.6
<b>Biomedical Only</b>	
HCP	1.9
Doctor/Nurse and HCP	0.0
Doctor/Nurse	8.7
<b>Providers Baby Saw During Postpartum Period</b>	
No Provider <sup>a</sup>	28.4
<b>Traditional Only</b>	
TBA	55.1
<b>Combined Care</b>	
TBA & Health Center or Post (HCP)	1.2
TBA & Doctor/Nurse	0.7
TBA, HCP, and Doctor/Nurse	
<b>Biomedical Only</b>	
HCP	4.5
Doctor/Nurse and HCP	0.1
Doctor/Nurse	10.1
<b>Number of Births</b>	<b>3,350</b>

<sup>a</sup> Among those births where no provider was seen, another person was consulted (i.e. family member, curer, injectionist, pharmacist, neighbor) in some cases (6 for prenatal check, 12 for postpartum check of mother, and 19 for postpartum check of baby)

<sup>b</sup> 97% of home births occurred in the respondent's home

<sup>c</sup> 83% of births in a medical facility occurred in the hospital, 14% in a clinic, and 3% in an HCP

Source: Mother interviews in the EGSF (1995)

**Table 3. Odds Ratios from Logit Regression Model Predicting Likelihood that TBA Frequently or Always Refers Clients to a Biomedical Provider**

Variable	Odds Ratio	P value
Trained TBA	23.33*	0.01
Any Formal Education	1.01	0.99
Indigenous	0.06*	0.03
Any Biomedical Services in the Community	1.60	0.54
Average Per Capita HH Consumption in the Community	0.91	0.21
Bus Transportation Available and Principal Road Open Year-Round	3.79	0.13
<b>Number of TBAs</b>	66	

\*  $p < 0.05$

Note: Model includes set of dummy variables for department of residence

of a trained TBA making a referral being 23 times higher than that of an untrained TBA. Education had no impact, which may be due to the relatively low levels of schooling attained by those that had any at all. Indigenous TBAs were less likely to refer women. Although not significantly related to referral status, the effect of access to bus transportation was substantial and in the expected direction. Neither the presence of a biomedical provider nor the income level of the community was related to referral practices.

#### *TBA Practices*

Nearly all TBAs routinely examine the position of the fetus and give advice about foods the mother should or should not eat during pregnancy. Most stated that they tried to change the position of the baby and administer herbal remedies, but the traditional practice of massage was practiced by few. More than 60% of TBAs had ever performed a vaginal exam, a practice that is considered potentially harmful because of the risk of infection and almost 40% did so routinely. About 30% of TBAs had taken a woman's blood pressure or pulse or had given injections of vitamins. Other biomedical treatments and practices — drawing blood, giving antibiotics, tetanus immunizations, injections of medicine, and administering injections at the time of delivery — appeared to be considerably less common among TBAs. Injections to speed delivery were given in 12 % and 15% of deliveries according to TBAs' and mothers' responses, respectively.

Several potentially harmful practices continue to be common. For example, almost a quarter of TBAs routinely push on the abdominal area at the beginning of delivery and half of TBAs normally put powder or ointments on the umbilical cord. Both of these procedures are considered dangerous (WHO, 1996). About a third of TBAs prepare the traditional sweat bath (temascal). TBAs frequently tell mothers to supplement breastmilk in the first week of life, which may interfere with

the initiation or continuation of breastfeeding. On the other hand, nearly all TBAs report that they routinely perform beneficial practices such as keeping the baby warm after birth, encouraging immediate breastfeeding, and immunizing the child.

#### *Quality of Care*

The percentage distribution of the 10 TBA practices reported by mothers and TBAs that were classified as beneficial or harmful are shown in Table 4. Beneficial practices were coded in terms of failing to perform the activity. Most TBAs perform between one and four of these harmful activities. Trained TBAs have scores almost identical to their untrained counterparts (2.58 as compared with 2.69, data not shown), a result that suggests that training has little effect on the practice of these harmful (or beneficial) practices. Results from a linear regression model using the quality of care index as the outcome and controlling for all but one of the covariates from the referral model are shown in Table 5. These results confirm what was observed in the descriptive analyses: the training programs had no effect on the overall quality of midwifery care. As in the case of referral practices, the effects of the TBA's education and the income level of the community are not significant. However, the presence of a biomedical provider in the community is associated with a lower score of harmful practices, while indigenous TBAs have a higher score than Ladino TBAs.

#### **Discussion**

The findings regarding the efficacy of efforts aimed at integrating TBAs into the formal health system in the communities covered by the 1995 EGSF were mixed. About 75% of TBAs in the sample attended a training course, indicating that the program is widespread. However, most pregnant women do not see a biomedical provider at any point during preg-

**Table 4. Distribution of Quality of Care Index**

<b>Individual Items in Index</b>		<b>%</b>
Ever Give Injection to Speed Delivery		12.1
Ever Give Antibiotics		4.5
Ever Put Powder or Ointment on the Umbilical Cord		54.5
Normally Push on Stomach at Beginning of Delivery		23.1
Normally Perform Vaginal Exam		37.9
Normally Tell Mother to Give Baby Sugar Water/Tea		75.8
Do Not Normally Keep the Baby Warm after Birth		10.6
Do Not Normally Encourage Breastfeeding		3.0
Do Not Normally Encourage Immunization		1.5
Do Not Normally Check Mother and Baby Postpartum		32.3
<b>Score on Index<sup>a</sup></b>		<b>%</b>
Zero	<b>N</b>	
One	1	1.6
Two	13	20.3
Three	16	25.0
Four	18	28.1
Five	12	18.8
	4	6.3

<sup>a</sup> On this index, a high score indicates greater use of potentially harmful practices (maximum possible score = 10)  
 Note: Two TBAs have missing values on the index  
 Source: TBA interviews in the EGSF (1995)

nancy. Previous research documents various reasons for women's low utilization of biomedical care, including fear, condescending attitudes of the providers, perceptions of poor quality of care, language constraints, poor access to health facilities, and lack of resources (Cosminsky, 1982; Rosenthal, 1987). Those who combine care between biomedical providers and TBAs make several visits to the former. Few women seek postpartum care with either type of provider. Consistent with the objectives of training programs, the majority of trained TBAs refer their patients to other providers for prenatal care and for problems. Although most do not refer women regularly, the training programs appear to have had a substantial impact on the frequency of referrals, with trained TBAs being much more likely to refer their patients than their untrained counterparts.

TBAs continue to offer traditional treatments. A large percent of TBAs have adopted biomedical practices such as performing vaginal exams and giving injections. The medicalization of midwifery care is of concern to the extent that practices adopted are harmful or inappropriate given their training and setting. Some practices may be beneficial (i.e., giving vitamins) and others may be harmless (i.e., taking blood pressure), but some are potentially dangerous to the pregnant woman and her unborn child (i.e., injections of oxytocin).

Even if training programs have achieved modest success in reducing the prevalence of traditional practices deemed harmful, it is likely to be offset by midwives' increasing exposure to biomedical treatments that require extensive training for appropriate use.

This study did not investigate the quality of biomedical care in these communities, since the necessary data were not available in the EGSF. Information from a qualitative portion of the study pointed out some of the failings of the biomedical care system, which concur with earlier studies noting the treatment of both patients and TBAs, might discourage women from using these services and TBAs from referring their patients there. Modifications would ideally be made to TBA practices as well, as to available biomedical care to promote better maternal and child health in Guatemala.

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**Table 5. Coefficients from Linear Regression Model Predicting Score on Quality of Care Index<sup>a</sup>**

Variable	Coefficient	P value
Intercept	1.61	
Trained TBA	-0.27	0.460
Any Formal Education	-0.43	0.231
Indigenous	1.13*	0.045
Any Biomedical Services in the Community	-0.74*	0.029
Average Per Capita HH Consumption in the Community	0.05	0.134
<b>Number of TBAs</b>	64	
<b>R<sup>2</sup></b>	0.22	
<b>Adjusted R<sup>2</sup></b>	0.11	

\* p < 0.05

<sup>a</sup> On this index, a high score indicates greater use of potentially harmful practices

Note: Model includes set of dummy variables for department of residence

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## Web-Based Tools for Monitoring and Evaluating Maternal and Newborn Health Programs

Silvia Alayón

- » **The Compendium of Maternal and Newborn Health Tools website is an online resource of monitoring and evaluation resources developed by a variety of organizations.**
- » **The user-friendly website provides information about 36 of the latest tools that have been field tested in developing countries and provides access to these tools.**
- » **It can be accessed at <http://www.cpc.unc.edu/measure/cmnh/cmnh.html> or at <http://www.cpc.unc.edu/measure> and clicking on “Maternal Health” under the heading “Monitoring and Evaluation of Population and Health Programs.”**

An increasing number of tools to monitor and evaluate maternal and newborn health programs have become available as Safe Motherhood programs mature. Various international agencies, nongovernmental organizations, and projects have developed instruments for tracking program progress and estimating national indicators of maternal and infant health. Locating these different instruments and protocols to select the best strategy for a given monitoring task could be daunting, since they are each located within the agencies that tested and implemented them. A compendium of these tools was developed and posted on the MEASURE *Evaluation* website (<http://www.cpc.unc.edu/measure>) to provide easy and efficient access to them by the wider public health community.

The Compendium of Maternal and Newborn Tools consists of 36 tools originating from a variety of sources. The compendium reflects contributions from WHO, UNICEF, CDC, MEASURE *Evaluation*, MEASURE *DHS+*, universities, and other organizations. Box 1 shows the complete list of tools. All tools that appear on the website are used for monitoring or evaluating maternal or newborn health status, appropriate for use in developing country settings, current, and field-tested.

The website is easy to use for both searching for an appropriate tool for a particular task or browsing available tools. The

list of tools is organized into four categories: program performance and context (including cost-related tools); facility-based and provider assessments; population-based knowledge, attitude, and practice surveys; and health outcome tools (including mortality and morbidity). Figure 1 is a picture of the initial page. A tool is selected by clicking on the tool's title.

Alternatively, the database can be searched based on the following categories:

- » Technical area: maternal health, neonatal health
- » Method: quantitative, qualitative
- » Language: English, French, Spanish, Portuguese, Arabic, Russian, Hindi
- » Purpose: monitoring, evaluation, assessment, needs assessment
- » Population or facility-based
- » Scope: behaviors, cost estimation, morbidity, mortality, quality of care, or use of services
- » Level: community, facility, district, provincial, national
- » Indicators

Selecting *any* or *either* is an option in each search category. Characteristics desired are identified from the list above by clicking on a drop down menu (Figure 2). For the best results, searches should be limited to only a few categories. The re-

Figure 1. List of Tools Web Page (Partial View)

http://www.cpc.unc.edu/measure/publications/tools/cmnht/list.html

**MEASURE Evaluation**

Home Countries Search Help/Guide Contact Us

You are here: [Compendium of Maternal and Newborn Health Tools](#) > [List of tools](#)

### INVENTORY OF TOOLS FOR ASSESSMENT, MONITORING AND EVALUATION IN MATERNAL AND NEONATAL HEALTH

[Search list](#)

Programme Performance and Context Including Costing Tools	Facility-Based/Provider Assessment	Population-Based Surveys of Knowledge, Attitude and Practice	Maternal Health Outcome Including Mortality and Morbidity
<a href="#">Mother-Baby Package Costing Spreadsheet (WHO)</a>	<a href="#">Safe Motherhood Needs Assessment (WHO)</a>	<a href="#">Woman's Questionnaire (Demographic and Health Survey (DHS))</a>	<a href="#">Using the DHS Household and Women's Questionnaires to Measure Nutritional Status (DHS)</a>
<a href="#">The Design and Evaluation of Maternal Mortality Programs (Center for Population and Family Health, SPH, Columbia University New York)</a>	<a href="#">Service Provision Assessment (SPA) (Measure/DHS)</a>	<a href="#">Multiple Indicator Cluster Survey (MICS) (UNICEF)</a>	<a href="#">Measuring Maternal Mortality from a Census: Guidelines for Potential Users (Measure Evaluation)</a>
<a href="#">SAFE Strategy Development Tool (SAFE International Research Partnership, The Dugald Baird Centre for</a>	<a href="#">Guidelines for Monitoring the Availability and Use of Obstetric Services (UNICEF/ WHO/ UNFPA)</a>	<a href="#">Rapid Knowledge Practice Coverage (KPC) Survey (CSTS/CORE)</a>	<a href="#">Maternal and Peri/Neonatal Mortality Survey Case Review Questionnaire (MotherCare)</a>

sult is a list of tools meeting those specifications and their sources. Figure 3 provides an example.

Clicking on a tool will take the user to a summary page. This summary page contains information about the tool, including its source, the technical area it addresses (maternal or newborn health), basic description, country applications, languages, general purpose (e.g. monitoring), technical purpose, design, method, frequency of administration, users of the resulting information, objectives of the tool, key indicators, tool

design, implementation and training, manuals and guidelines, data processing and analysis, reporting and dissemination of results, cost, lessons from experience, a contact person, and a link to the tool itself. When possible, the tool is available on the MEASURE *Evaluation* website. In many cases, a link is provided to the source website of the tool where the user can find the instrument itself. In a few cases, it is necessary to contact MEASURE *Evaluation* for an electronic or paper copy of a tool.

Figure 2. Search Web Page Where the User Can Specify Characteristics of Tools (Partial View)

The screenshot shows a web browser window with the URL <http://www.cpc.unc.edu/measure/publications/tools/cmnhnt/search.php>. The page header features the MEASURE Evaluation logo and navigation buttons for Home, Countries, Search, Help/Guide, and Contact Us. Below the header, a breadcrumb trail reads: "You are here: [Compendium of Maternal and Newborn Health Tools](#) > [Search Tools](#)".

The main content area is titled "Search Page" and contains a message: "There are about 40 tools in the *Compendium of Maternal and Newborn Tools*. Therefore, please search in as few categories as possible to avoid getting no results. You can select more than one item in a category by holding down the *Ctrl* key and clicking."

Below the message is a search form with the following fields and options:

Submit	Reset
Technical Area:	-CHOOSE ONE-
Method:	-CHOOSE ONE-
Language:	-CHOOSE ONE- Quantitative Qualitative EITHER Spanish Portuguese Arabic Russian
Purpose:	ANY Monitoring Evaluation Assessment
Population/Facility:	-CHOOSE ONE-
Scope:	ANY Behaviors Cost Estimation Knowledge Morbidity Mortality Quality of Care
Level:	ANY Facility Community District

There is also a comprehensive set of links to other websites related to maternal and neonatal health posted on the site, including those related to monitoring and evaluation in general and UNICEF and WHO indicators.

used as a resource for developing new instruments. Tools are periodically added to this website so that it can serve as an updated resource for program managers and public health professionals.

Easy access to these various tools for maternal and neonatal health programs can enable local organizations to monitor and evaluate programs effectively. The MEASURE *Evaluation* website provides an inventory of current tools that have been field-tested. These can be adapted to a local setting or can be

**Figure 3. Example of Results from Using the Search Function, After Specifying Technical Area as *Maternal and Newborn Health*, Either Quantitative or Qualitative Methods, and Spanish Language**

http://www.cpc.unc.edu/measure/publications/tools/cmnhnt/search.php

**MEASURE Evaluation**

Home Countries Search Help/Guide Contact Us

You are here: [Compendium of Maternal and Newborn Health Tools](#) > [Search Tools](#)

Results Page

[Return to the search page](#)

Title	Source/Origin
<a href="#">Woman's Questionnaire, DHS</a>	DHS
<a href="#">Mother-Baby Package Costing Spreadsheet</a>	WHO
<a href="#">Maternal Anemia Assessment, Household Questionnaire, DHS</a>	DHS
<a href="#">Multiple Indicator Cluster Survey (MICS)</a>	UNICEF
<a href="#">The Autodiagnosis: A Methodology to Facilitate Maternal and Neonatal Health Problem Identification and Prioritization in Women's Groups (in Rural Bolivia)</a>	Save the Children/MotherCare
<a href="#">Life Saving Skills Checklist</a>	ACNM

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 Last modified on 4 February 2002

## Box 1. Contents of the Compendium of Tools

### Program Performance and Context (including costing tools)

- » Mother Baby Package Costing Spreadsheet (WHO)
- » Design and Evaluation of Maternal Mortality Programs (Columbia University)
- » SAFE Strategy Development Tool (University of Aberdeen)
- » Maternal and Neonatal Program Effort Index (Futures Group International)
- » Cost Estimation Strategy for Improving the Availability and Use of Reproductive Health Commodities (MSH)
- » Cost of Maternal Health Care Services (Abt Associates)

### Facility-Based/Provider Assessment

- » Safe Motherhood Needs Assessment (WHO)
- » Service Provision Assessment (SPA) (MEASURE *DHS+*)
- » Guidelines for Monitoring the Availability and Use of Obstetric Services (UNICEF /WHO/UNFPA)
- » Quality Measuring Tool for Reproductive Health Services (Engender Health)
- » Quick Investigation of Quality (QIQ) Adapted for Antenatal Care (MEASURE *Evaluation*)
- » Life Saving Skills Checklist (American College of Nurses and Midwives)
- » Guidelines and Instruments for a Situation Analysis of Obstetric Services (Population Council)
- » Traditional Birth Attendant Interview Questionnaire (FHI)
- » Rapid Evaluation Method Guidelines for Maternal and Child Health, Family Planning and Other Health Services (WHO)
- » Baby-Friendly Hospital Initiative – Monitoring and Reassessment: Tools to Sustain Progress (WHO)

### Population-Based Surveys of Knowledge, Attitude, and Practice

- » Women's Questionnaire from Demographic and Health Survey (MEASURE *DHS+*)
- » Multiple Indicator Cluster Survey (MICS) (UNICEF)
- » Rapid Knowledge, Practice, Coverage (KPC) Survey (CSTS/CORE)
- » "Autodiagnosis:" A Methodology to Facilitate Maternal and Neonatal Health Problem Identification and Prioritization in Women's Groups (in Rural Bolivia) (MotherCare/Save the Children)
- » Assessing Safe Motherhood in the Community: A Guide to Formative Research (MotherCare)
- » Reproductive Health Surveys (DHHS/CDC)
- » Reproductive Health Questionnaire: The Arab Family Health Survey (PAPFAM)

### Maternal and Neonatal Health Outcome, Including Morbidity and Mortality

- » Using the DHS Household Questionnaire to Measure Nutritional Status (MEASURE *DHS+*)
- » Measuring Maternal Mortality from a Census: Guidelines for Potential Users (MEASURE *Evaluation*)
- » Maternal and Peri/Neonatal Mortality Survey Case Review Questionnaire (MotherCare)
- » Morbidity and Performance Assessment: Verbal Autopsy (MAP) (PRIME/Intrah)
- » Adapted Reproductive Age Mortality Survey (RAMOS) Guidelines (DHHS/CDC)
- » Maternal Mortality Module in DHS: Direct Sisterhood Method (MEASURE *DHS+*)
- » The Partograph (WHO)
- » Verbal Autopsies for Maternal Deaths – Report of a Workshop (WHO)
- » A Standard Verbal Autopsy Method for Investigating Causes of Death in Infants and Children (WHO/ Johns Hopkins University/London School of Hygiene and Tropical Medicine)

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## » **Bulletin 3:** Monitoring National Progress with Composite Indices

### » **Manuals**

- Compendium of Indicators for Evaluating Reproductive Health Programs [MS-02-06]
- Measuring Maternal Mortality from a Census: Guidelines for Potential Users [MS-01-04]

### » **Technical Reports**

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- Maternity Care: A Comparative Report on the Availability and Use of Maternity Services [TR-01-09]

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- Trends in Reproductive Health Knowledge, Attitudes and Practices in the CREHP Districts of Uganda, 1995-2000 [SR-02-13]
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- Estimates of Maternal Mortality in Guatemala 1996 – 1998, March 2000 [SR-00-01]
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- The Impact of a Reproductive Health Project Interventions on Contraceptive Use in Uganda [WP-02-49]
- Cost and Efficiency of Reproductive Health Service Provision at the Facility Level in Paraguay [WP-02-45]
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- Do Health Services Reduce Maternal Mortality? Evidence from Ratings of Maternal Health Programs [WP-01-39]
- Rating Maternal and Neonatal Health Programs in Developing Countries [WP-00-26]

### » **Journal Articles**

- “Evaluation of Midwifery Care: Results from a Survey in Rural Guatemala.” Noreen Goldman and Dana Glei. *Social Science and Medicine*, 2003. 56(4): 685-700. [JA-03-38]
- “Inequality and Changes in Women's Use of Maternal Health-care Services in Tajikistan.” Jane Falkingham. *Studies in Family Planning*, 2003. 34(1): 32-43. [JA-03-36]
- “Demographic and Health Surveys: Caesarean Section Rates in Sub-Saharan Africa.” Pierre Buekens, Siân Curtis, and Silvia Alayón. *British Medical Journal*, 2003. 325: 136. [JA-02-31]
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- “Domestic Violence in Northern India.” Sandra Martin, Amy Tsui, and Ruth Marinshaw. *American Journal of Epidemiology*, 1999. 150(4): 417-427. [JA-99-08]
- “What Husbands in Northern India Know about Reproductive Health: Correlates of Knowledge about Pregnancy and Maternal and Sexual Health.” Shelah Bloom, Amy Tsui, Mayra Plotkin, and Sarah Bassett-Hileman. *Journal of Biosocial Science*, 2000. 32: 237-251. [JA-00-15]

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