



# MotherCare™ *Matters*

A Quarterly Newsletter and Literature Review on  
Maternal and Neonatal Health and Nutrition

## Safe Motherhood Indicators— Lessons Learned in Measuring Progress

### ***Introduction***

Measuring progress in maternal health programs and projects has remained a challenge over the past decade. Initially, measuring progress in Safe Motherhood was assumed to mean measuring change in maternal mortality levels. This has proved impractical in most cases.

While there are several methods to determine the level of maternal mortality, each method is limited if the goal is to measure a significant change in a short period of time—three to five years. Vital registration systems are known to underreport maternal mortality, even in the United States where most women deliver in a facility. Household surveys require extremely large sample sizes, generally making this method too expensive. Initially there was optimism that the sisterhood method (an indirect measure of maternal mortality) could gather the required information with a smaller sample size (which it can), however it can only give a retrospective estimate of the Maternal Mortality Ratio (MMR) for the past 10 to 12 years. The sisterhood method can be used to set a baseline but cannot provide an estimate for change at the end of a relatively short period. Hospital data give only those maternal deaths that occur in the facility and are thus biased in those

areas/countries where a large proportion of the births take place at home. Health surveillance is one possibility to measure change in maternal mortality. It has recently been used in Honduras and its results are described in *Box 1—Keeping Our Eyes on the Target—The Importance of Monitoring Maternal Mortality*. Depending on the number of maternal deaths, however, health surveillance is also likely to require more time than is available in a typical project period to determine a significant change in the MMR.

Unfortunately, measuring change in the rate of major direct obstetric complications known to lead to maternal death is unlikely to replace maternal mortality as an indicator of progress. Most Safe Motherhood interventions do not aim to prevent complications *per se*. Instead they aim to prevent complications from becoming more severe or from leading to death. While measuring death is clear even to the untrained, measuring severity of complications is debated, even by clinicians. This makes reporting by classification of severity not a feasible option for even those women in a facility attended by a professional. Asking women directly about complications has not proved biomedically valid (sensitive or specific enough) when compared with medical diagnosis (see *Statement from a Task Force Meeting on Validation of Women's Reporting of Obstetric Complications in National Surveys*, reprinted in this issue on page 23-24 from *MotherCare Matters*, 6 (2): March, 1997).

Since neither the maternal mortality ratio (MMR) nor the severity of the maternal morbidity level are practical measures of impact for Safe Motherhood projects or programs, the present recommendation of WHO, UNICEF and others, is to rely on process indicators to measure change in project outcomes. To learn from the field, MotherCare conducted a workshop in

## Box 1—Keeping Our Eyes on the Target— The Importance of Monitoring Maternal Mortality

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Increasingly, investigators and policy makers are relying on process indicators to measure progress in reducing maternal mortality. However, process indicators are limited: they do not measure the effectiveness of the process, and more importantly, they do not measure the primary event of interest — maternal death. Although process indicators may be useful temporarily, efforts must continue to improve measurement of maternal deaths. Experience in several countries suggests that such measurement is possible and feasible. Even Honduras, considered one of the poorest countries in Latin America, was able to identify its maternal deaths.

In 1990, the Honduran Ministry of Health carried out a study of mortality among women of reproductive age and identified 314 maternal deaths. A follow-up study identified 192 maternal deaths in 1997. Assessments of the completeness of reporting in these studies used expected age-specific mortality rates based on life-expectancy; findings correlated well with the expected number of deaths. The outcome indicators that were calculated included maternal mortality ratios and rates.

The cost of the 1997 study was minimal. Some of the work of identifying and investigating deaths was carried out by departments of health at the departmental and municipal level as part of their routine surveillance. In addition, four female assistants were hired for four to five months each to supplement the work of the departments. These temporary staff visited hospitals, cemeteries, had key informants in communities, and checked vital records and forensic and autopsy logbooks to ensure that all deaths of women of reproductive age had been identified. The cost of hiring the women was \$8000.00 (U.S.). The Honduran Ministry of Health is now considering how to incorporate this experience into their ongoing public health surveillance.

	1990 study	1997 study
WRA* mortality rate per 1000 WRA	1.43 (n=1757)	1.50 (n=2413)
All deaths within 42 days of pregnancy per 100,000 live births	221	150
Maternal mortality ratio (MMR)	182	115**
Maternal mortality rate (per 1000 WRA)	0.26	0.13

\* WRA - Women of reproductive age

\*\* The reduction of the MMR from 182 to 115 is statistically significant.

In some instances, process indicators are more effective than outcome indicators as measures of the success of maternal health programs. For example, when maternal deaths are counted over a short period of time in a small area of population, small numbers may not show a significant change. However, the use of process indicators would not have suggested a maternal mortality reduction of 50% in Honduras. The national cesarean delivery rate did not change at all during this time period (6.4% vs. 6.3%), and the proportion of women attended by a skilled attendant only increased from approximately 44% to 54% in the five-year periods prior to the years of the study.

WHO Targets for Health for All in the 21st Century include a maternal mortality ratio of 100 per 100,000 live births by 2020. The measurement of all maternal deaths is critical to assessing whether this goal has been reached. The WHO study of essential public health functions ranks monitoring of morbidity and mortality as second in importance only to immunization. Most of the countries in the world have systems for surveillance of important public health events. Surveillance experience has been increasing world-

## Box 1—Continued

wide as disease elimination efforts continue (e.g. for smallpox, polio, measles, and guinea-worm) and as experience accrues in controlling epidemics such as cholera. The tremendous strides that have been made in eliminating and controlling diseases globally would not have been possible without surveillance. Maternal mortality should be included as an event for routine public health surveillance.

If maternal mortality is to be reduced, we must keep our eyes on the target and count every maternal death, as well as investigate each one to help develop appropriate public health actions to prevent future deaths. This focused effort can be guided by identifying deaths of women of reproductive age, ascertaining whether the death was maternal, and assessing the causes, both medical and non-medical, of the death. The experience in Honduras suggests that such a national approach is feasible.

### *General Reference*

- Berg, C., Danel, I. and Mora, G. 1996. Guidelines for Maternal Mortality Epidemiological Surveillance. Washington, DC: PAHO.
- Bettcher, D.W., Sapirie, S.A. and Goon, E.H.T. 1998. Essential public health functions: Results of the international Delphi study. *World Health Statistics Quarterly* 51:44-54.
- Visschedijk, J. and Simeant, S. 1998. Targets for health for all in the 21st century. *World Health Statistics Quarterly* 51:56-67.

June 1998 to assess our experience with select maternal health process indicators, specifically those most promising for measuring access/use of care and quality of care. These include:

#### ◆ **Access/Use of Services Indicators**

- *Met Need for Essential Obstetric Care*
- *Unmet Obstetric Need*
- *Cesarean Section Rate*
- *Who delivers the woman, and where does birth take place*

#### ◆ **Quality of care indicators**

- *Case Fatality Rate (and numbers of maternal deaths)*
- *Referral Rates*

Although other indicators hold promise and are listed in the *Guidelines for Monitoring the Availability and Use of Obstetric Services*,<sup>1</sup> they were not selected for discussion because they are not as closely linked to maternal death or

there is little to no experience with them. These indicators include: *number of facilities providing EOC per 500,000 population*, and the *proportion of women attended at least once during pregnancy by trained health personnel*.

This *MotherCare Matters* brings you a summary of the presentations and debates at the 1998 workshop regarding the access and quality of care indicators for Safe Motherhood Programs. This workshop was organized by Dr. Zahid Huque, Senior Technical Advisor for Maternal and Newborn Health, MotherCare, and participants to the workshop are listed in **Appendix 1**. Also in this issue you will find the first two **policy briefs** in a series: *Essential Obstetric Care and Subsets—Basic and Emergency Obstetric Care: What's the Difference?* and *Safe Motherhood Indicators: Measuring Progress* inserted as separate sheets.

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<sup>1</sup> UNICEF, WHO, UNFPA. 1997. *Guidelines for Monitoring the Availability and Use of Obstetric Services*. New York: UNICEF.

# Access/Use of Service Indicators

## I. Met Need for Essential Obstetric Care (EOC)

### A. Definition

*Proportion of women with major obstetric complications who are appropriately managed in a specific geographic area in a given time period. (See Policy Brief 1 for an elaborated definition of EOC)*

**Numerator:** Number of women with a major direct obstetric complication who are appropriately managed, in a specific geographic area, in a given time period

**Denominator:** Number of women with major obstetric complications estimated for the same geographic area and time period

### B. Definition of Important Terms

#### Numerator

#### 1. Who should be included in the numerator?

The unit of analysis is one admission or consultation of a woman with a direct obstetric complication, living in the geographic area of interest. Women who come to a facility two or more times with complications are included two or more times. However, it is anticipated that two or more admissions of the same woman to a facility occurs at a minimal rate. Even so, admissions (or consultations) of a woman with major obstetric complications more accurately describes the unit of analysis in the numerator, rather than woman with a direct obstetric complication, living in the geographic area of interest.

Women living in the same geographic area (e.g., district, province) of interest should be included in both the numerator and denomina-

tor of the *Met Need*. The calculation of the numerator necessitates an address for each woman in the birth registry (level of specificity determined by geographic area of interest) and the exclusion of those living outside the study areas. While this may seem unduly detailed, it has been noted that referral hospitals may draw their clientele from long distances and thus inflate the numerator.

Those women leaving their area for management of complications will not be captured. While this could lead to an underestimation of the *Met Need*, the possible extent of this bias could be estimated through asking a sample of recently delivered women in the study area where they delivered (e.g., district).

#### 2. What “major direct obstetric complications” should be included?

Major Obstetric Complications could be defined broadly, risking overestimation of the *Met Need* through false positives or defined more narrowly, possibly underestimating the *Met Need* but increasing reliability and comparability.

The *broader definition* includes direct obstetric complications (dystocia, hemorrhage, hypertensive disorders of pregnancy, sepsis), and may include women with severe anemia (Hb < 7g/dl or its equivalent, adjusted for altitude) and multiple gestation. Both the *Guidelines*<sup>2</sup> and MotherCare have used broad definitions in their calculations of the *Met Need*. The differences in definition are shown in **Appendix 2**.

While the definition calls for including only women with “major direct obstetric complications,” all women with *any direct obstetric complication*, mild or severe, listed in **Appendix 2**, have been included in MotherCare’s *Met Need* calculations. This most likely leads to an overestimation of the *Met Need*. Note, discerning a major or severe complication from its more mild form is not possible through a review of birth registers.

<sup>2</sup> UNICEF, WHO, UNFPA. 1997. *Guidelines for Monitoring the Availability and Use of Obstetric Services*. New York: UNICEF.

The numbers of women with complications post-abortion vary over time and by site, and hence the *Met Need* is more comparable if post-abortion complications are excluded. At any rate, the author should specify whether post-abortion complications are included or not. Note that post-abortion complications are not included in the denominator, which, as explained below, is an estimate based on the *Crude Birth Rate* (CBR). The CBR provides an estimate of live births only.

Data from MotherCare in Guatemala (See Table 1) calculates the *Met Need* with and without post-abortion complications (and with/without ectopic pregnancies). The difference in the *Met Need* with and without post-abortion complications and ectopic pregnancies is considerable. Without post-abortion complications, the *Met Need* is nearly a third to half the rate when such complications are included in three of four health zones.

By more narrowly defining the complications and reducing the false positives, the *Met Need* becomes more specific, although it may err on the low side. However, by being so specific, the indicator may become more reliable and hence, more comparable across facilities within a country,

**Table 1—Met Need Calculated from Hospital Register in Four Hospitals in Guatemala\***

	San Marcos		Solola		Toto		Xela	
	T1	T2	T1	T2 <sup>a</sup>	T1	T2 <sup>a</sup>	T1	T2 <sup>a</sup>
No. of cases	1258	1260	456		285		1149	
No. of obstetric cases	975	972	374		214		1011	
No. of abortion cases	196	208	55		46		126	
No. gynecological cases or unknown	87	80	27		25		12	
Maternal complication rate (%)	29	25	35		35		18	
Met Need % (incl. abortion & ectopics)	13	15	17		8		14	
Met Need % (exclude abortion & ectopics)	5	5	13		4		5	

\* Data from four hospitals were collected between September 1995 and April 1996 (T1) to determine the met need of obstetric care in four regions of Guatemala. Data were collected again in San Marcos between September 1997 and February 1998 (T2).

<sup>a</sup> data not yet analyzed at time of meeting

Note: Denominator is 15% of live births in the area

Source: Elizabeth Bocaletti, Jorge Matute, and Patricia Bailey, 1998; MotherCare/Guatemala

**Table 2—Observed Obstetric Admissions by District of Residence According to the Definition of Complications**  
(South Kalimantan, December 1996 - November 1997)

District of Residence	Obstetric Admissions Allowed by Definition				
	UNICEF	MotherCare	MOI/AMI	MOI/AMI + eclampsia	Cesarean Section
Banjar Pop. 488,872 Live Births 11,977	1099	896	147	179	276
Barito Kuala Pop. 289,692 Live Births 7097	189	166	26	30	47
Hulu Sangai Selatan Pop. 192,562 Live Births 4718	413	323	31	47	79

Source: Carine Ronsmans, May 1998

among developing countries, or over time in one area (Table 2 shows how the numbers change for the MotherCare districts in South Kalimantan, Indonesia, depending on the definition used). The *cesarean section rate* for the population and the *Major Obstetric*

*Interventions for Absolute Maternal Indications (MOI/AMI)* are more specific *Met Need* indicators and therefore, more reliable for comparative purposes (See page 8, UON, Section B for further discussion).

### 3. What is “appropriately managed?”

To date, the focus of the numerator has been on defining the obstetric complications. As interventions for these complications are rarely reported in birth registers, the primary data source for complicated cases, and there are few facilities with protocols against which to compare the treatment, there has been no attempt to determine what “appropriately managed” means in any of the sites reported at the workshop.

## Denominator

### 1. What is the level of women with major obstetric complications for an area?

*Estimation:* It has been estimated by a group of experts convened by WHO that 15 percent of women with live births may suffer a major obstetric complication.<sup>3</sup> This estimate assumes that there is a constancy of *direct obstetric complications* across countries. A study of severe maternal morbidity in six West African countries suggests that half the WHO rate is experienced there, and there *does* appear to be variation across countries.<sup>4</sup> However, based on record and literature reviews, DeBrouwere estimates the absolute maternal indications (AMI—see page 8) or complications, is in the range of one to two percent. Without further validation, however, no new percentage is being proposed at this time for the estimate of *major obstetric complications* among pregnant women in the denominator.

The estimated 15 percent of women with live births who suffer major direct obstetric compli-

cations can be calculated by multiplying the **Crude Birth Rate (CBR) for the country (unless a more specific CBR for the geographic area of the project is known)**, by the **population of the geographic area of interest**. Note that all factors in this denominator are estimates: the 15 percent, the CBR, and the population number.

Depending on what is used for the population or CBR, different estimates for the denominator can be calculated. In Guatemala, for example, the population projection for the year of interest was based on government estimates; this projection, however, was quite different from that based on adding the accumulated growth over time (calculated by using an estimated Growth Rate) to the population number provided in an earlier census.

*Live Births or Pregnancies:* Given that the 15 percent estimate is based on the estimated live births, it has been suggested the 15 percent is not needed, and that estimated ‘live births’ for the area of interest be used in the denominator.<sup>5</sup> This has not been tried, although considered a useful suggestion.

Whichever of these denominators is used, it should be realized that the estimation used in their calculation conveys an unknown degree of imprecision to the resulting *Met Need*.

## C. Data Sources

*Facility Registers:* Birth registers in facilities in the geographic area of interest are the most useful source of information on admissions for *major obstetric complications*. Population-based surveys that gather this information directly from women are not considered useful because results of validation studies that compared hospital records with women’s self-report (three or more months post-delivery) have shown that women’s self-report of obstetric complications is neither sensitive nor specific enough<sup>6,7</sup> (see attached statement of the *Task Force Meeting on*

<sup>3</sup> WHO. 1994. Indicators to Monitor Maternal Health Goals: Report of a Technical Working Group, Geneva, 8-12 November 1993. Geneva: WHO, WHO/FHE/MSM/94.14.

<sup>4</sup> de Bernis, MOMA, personal communication, June 1998.

<sup>5</sup> O. Campbell, personal communication, June 1998.

<sup>6</sup> Ronsmans, C., Achadi, E., Cohen, S., Zazri, A. 1997. Women’s Recall of Obstetric Complications in South Kalimantan, Indonesia. *Studies in Family Planning* 28 (3): 203-214.

<sup>7</sup> Seoane, G., Castrillo, M., O’Rourke, K. 1998. A Validation Study of Maternal Self Reports of Obstetric Complications: Implications for Health Surveys. *International Journal of Gynecology and Obstetrics* 62 (229-236).

## *Validation of Women's Reporting of Obstetric Complications in National Surveys*

A professional provider's diagnosis of an obstetric complication is considered the 'gold standard,' even though there are reports of professional's misdiagnosis, misclassification due to no standards of care available or none used, inadequate/incomplete recording, and variation in diagnosis or judgment of severity among providers.<sup>8</sup> While the individual patient's record is the 'gold standard,' it was noted in Bolivia that the use of different data sources (health information system, clinical records, registers) to calculate the *Met Need*, gave different totals, although they typically all originated from the clinical records.

While birth registers may capture most women with obstetric complications presenting at an EOC facility, there are other possible sources that should be checked for additional information: post-partum sepsis cases may go to a fever ward or hospital; post-abortion cases (if such are included in the obstetric complications definition) may also be found in other facility wards (e.g., Gyn ward).

The *Met Need* typically describes cases in a specific geographic area. To ensure completeness, birth registers in private facilities managing *major obstetric complications* in that area should be included in the calculation if feasible.

### ***Registers of Clinic and Village-based***

***Professional Providers:*** If professional providers (public or private) with appropriate EOC skills are located at the village level or at clinics with or without beds, their registries should also be reviewed as they may be managing women with obstetric complications.

## **D. Use and Interpretation**

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### ***1. What does Met Need measure?***

*Met Need* measures the level of use of services by women with any *direct obstetric complication* in a specific geographic area.

### ***2. What is the target for the Met Need indicator?***

Because of the variability in the numerator (narrow to broad definitions of 'major direct obstetric complications'), setting the target for what a district, province or country can achieve in terms of *Met Need* within a specific time frame, has proved difficult. While WHO maintains that 100 percent of women with *major direct obstetric complications* should be managed appropriately, this target is too high to be of practical use for monitoring programs or projects where most deliveries occur at home. Given the variability in choice of numerators and denominators, as well as field realities, it is recommended that local targets for this indicator need to be set.

### ***3. Can the Met Need indicator be used to compare districts in a program area?***

By holding the definitions of both the numerator and denominator constant (e.g., a specific list of direct obstetric complications used in the numerator and 15 percent of live births in the denominator), the patterns of access/use of services across districts can be determined.

### ***4. Can the Met Need indicator be used to measure progress in a program?***

Yes, given a specific definition of the numerator and denominator and using them consistently over time, this indicator can be used to measure progress in use of services.

### ***5. Can the Met Need indicator be used to compare districts/provinces in a national program?***

While the answer remains potentially yes, the amount of work/resources needed to affect a useful data collection and analysis system to determine the *Met Need* across districts/provinces throughout the country must be considered. Typically it means ensuring that the addresses of women are collected, and their

<sup>8</sup> E. Goodburn; P. Bailey; C. Ronsmans, personal communication, June 1998.

complications are recorded in all birth registers. Most of the other necessary and useful data, such as pregnancy outcome, are already recorded. To determine the appropriateness of management, the specific intervention made, given the complication, would be most helpful. This information was not recorded in the studies reported at the meeting.

### 6. Can the Met Need indicator be used to compare countries?

This is possible only if the same definitions (numerator and denominator) are used among the countries. However, it should be noted, these definitions may not be similarly interpreted by the providers recording the data (this is a problem even among facilities within one country).

### 7. What have been the uses of the Met Need indicator?

In Bolivia and Guatemala, the *Met Need* indicator has been used for supervision at the municipality and district hospital levels respectively. In Indonesia and Guatemala, it has also been used for advocacy at the district level and at national level in Cambodia and Morocco.

## II. Unmet Obstetric Need (UON) for Major Interventions

### A. Definition

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*Estimate of the number of women needing a major obstetric intervention for life-threatening complications who did not have access to appropriate care*

#### Calculation

Estimate of the number of major obstetric interventions (MOI) for selected indications (Absolute Maternal Indications or AMI) needed, minus the number of MOI/AMI actually performed. (Note that MOI/AMI means the number of major obstetric interventions for absolute maternal indications;

it does not signify division of MOI by AMI).

### B. Definition of Important Terms

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#### 1. What is UON?

The concept of *UON* refers to the discrepancy between what the health care system should do to deal with the obstetric problems in a given population and the care it actually provides. Operationally, *UON* is expressed in terms of women who should have benefited from a major obstetric intervention but for whom this intervention did not take place.

#### 2. What is included in the MOI and AMI?

*Major obstetric interventions (MOI)* include: the major surgical interventions: cesarean section, laparotomy (for uterine breech), hysterectomy, internal version, symphysiotomy and craniotomy. Not included are the interventions of forceps and vacuum extraction, post-partum manual removal of placenta, blood transfusion, uterine curettage, perineal tear repair, and treatment of infection.

*Absolute Maternal Indications (AMI)* include: severe antepartum hemorrhage (placenta *previa* and *abruptio*), severe postpartum hemorrhage, fetopelvic dystocia (due to small pelvis or hydrocephalus), and malpresentation (shoulder or transverse lie and brow presentation). These complications require hospitalization and were selected for their reproducibility and credibility. Indications not included are hypertensive disorders (including eclampsia); breech, face, cord presentations, and twins; severe anemia; infection; postpartum hemorrhage; psychosis; embolism and cervical or perineal tear.

The optimum MOI/AMI needed can be estimated by multiplying the number of deliveries in each area by a *reference rate*. The *reference rate* for the MOI/AMI, or the level of major surgical interventions needed, can be derived from an urban population living close to and having access to a reference hospital. In Mali, for example, two well-covered “urban” settings had a 1.2 to 1.35 percent rate of major obstetri-

cal surgery, while in a median urban setting in Morocco, the rate was one percent.

To know the number of MOI/AMI carried out (the number to be subtracted), registers from hospital admissions, maternity wards, operation theaters, delivery rooms, intensive care wards, surgical female wards, resuscitation rooms, and medical files should be cross-checked among all possible facilities in a study area. If no such records are available, prospective recording of indications/complications is necessary, typically over a year period, requiring the collaboration of local health care providers.

### 3. Are these data reliable?

In some areas the reliability of the number of expected deliveries, the residence of women, and the maternal indications (complications), may pose problems of reliability, as noted above for the *Met Need* indicator.

### 4. Are these data valid?

DeBrouwere and Van Lerberghe estimate that deficits of MOI/AMI are valid in areas where the maternal mortality ratios are higher than 300, the main causes relate to obstructed labor and antepartum hemorrhage, and access to comprehensive obstetric care is the major problem.

### 5. What is the sensitivity and specificity of the data?

DeBrouwere and Van Lerberghe state that the indicator can reflect the variation (improvement) in the coverage of the *Unmet Obstetric Need* in a large population (more than 10 to 15,000 deliveries per year). It is anticipated that the specificity is high except where it is not possible to retrospectively distinguish cephalopelvic disproportion from other causes of prolonged labor.

## C. Use and Interpretation

The *UON* measures the lack of coverage for women with specific direct obstetric complications.

*Spatial Analysis* provides estimates of deficits in MOI/AMI through mapping areas (districts/

provinces). Such maps have been used in Morocco successfully by the Institut National d'Administration Sanitaire as a starting point for discussions with providers and decision-makers, with a view toward adapting maternal health policy and mobilizing resources (Figure 1, page 10). The white areas of the maps show where intervention is minimal and where strategies to improve coverage of severe obstetric complications are needed.

*Temporal analysis* can also be done to monitor progress over time in a particular area, perhaps best on a yearly basis. This provides feedback to providers on their attempts to improve effective coverage.

## III. Cesarean Section Rates

### A. Definition

*Proportion of pregnant women who have a cesarean section in a specific geographic area in a given time period*

**Numerator:** Number of pregnant women with *cesarean section* in a specific geographic area in a given time period

**Denominator:** Number of live births in a specific geographic area in the same time period as in the numerator

### B. Definition of Important Terms

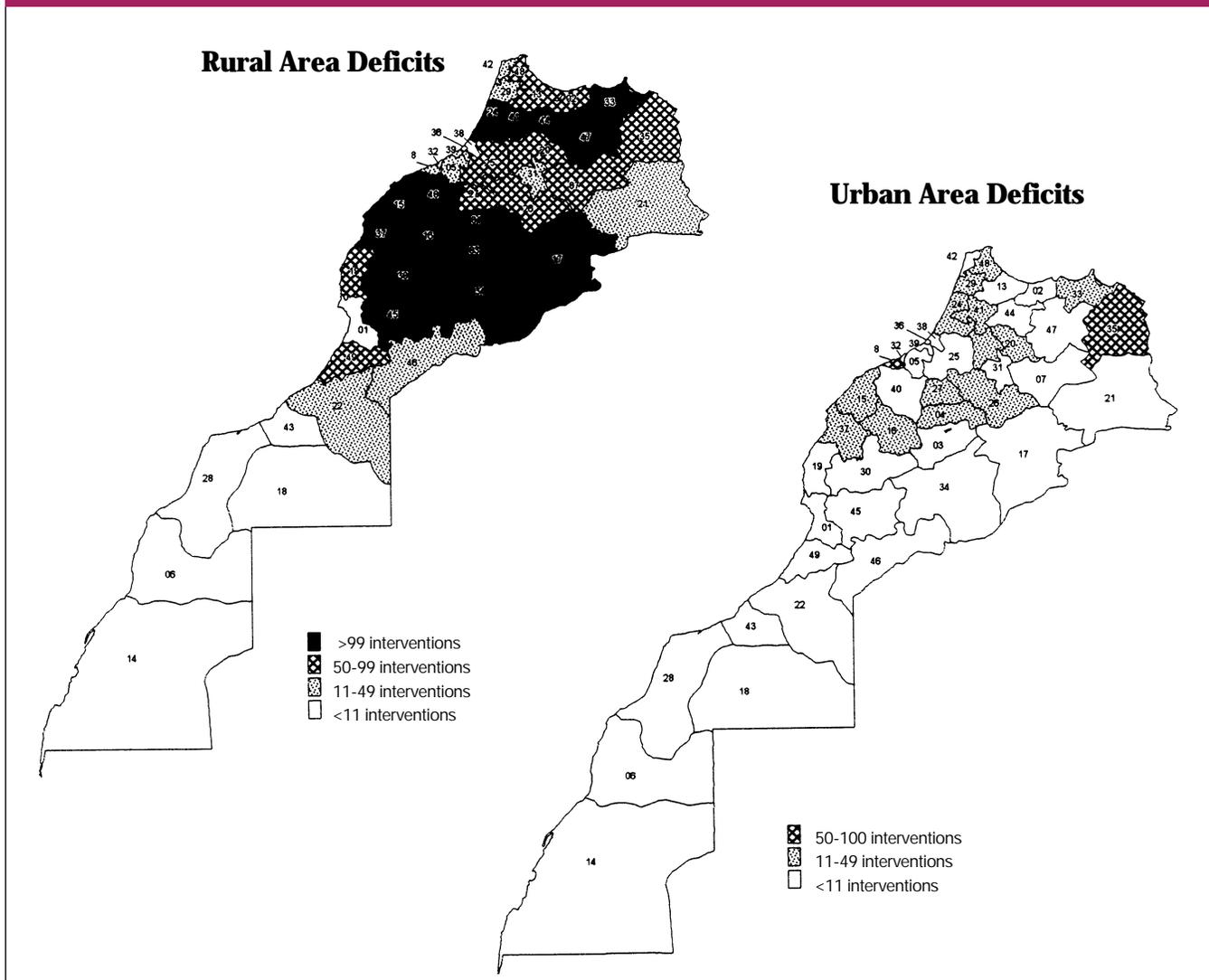
Note that the numerator is defined as all pregnancies, while the denominator is based on live births. While the ideal would be pregnancy-based information in both the numerator and denominator, this is typically not available. Second best for this indicator, is all *cesarean sections* in the numerator no matter what the outcome (either still- or live-births), and in the denominator should be all live births.

#### Numerator

The numerator can be gathered from birth registers in all facilities in a given area or estimated through population-based surveys (using the last pregnancy only).\*

\* Note that population-based surveys typically ask about live births only, not pregnancies.

Figure 1—Unmet Obstetric Need for Absolute Maternal Indication, Morocco 1989



## Denominator

The denominator is an estimate of live births calculated by **multiplying the population by the Crude Birth Rate**. The qualifiers noted above for the *Met Need* indicator hold here as well: this denominator is an estimate with an unknown level of precision.

## C. Data Sources

### 1. What are the data sources for C-section rates?

*Cesarean section* data are available from both facility birth registers and population-based sur-

veys. Which data source is more valid and practical to use can be debated, although both the frequency of collection and the geographic area to be covered must be factored into the decision. For a yearly level, collecting the information from facility registers may be most practical. In order to ensure a population-based *cesarean section rate* using such data, registers from *all* facilities providing a *C-section* in the geographic area must be included (both public and private providers).

While some agree that fewer *cesarean section* cases may be missed by collecting such data through population-based surveys—primarily because of the difficulty in getting data from private providers and when the geographic

**Table 3—Indications for Cesarean Sections by Health Facility (%)***(South Kalimantan, December 1996 - November 1997)*

	Health Facility*					ALL
	Ulin (N=241)	Banjar Baru (N=225)	Martapura (N=109)	Marabahan (N=32)	Kandangan (N=82)	
Antepartum hemorrhage	10	9	15	22	4	10
Cephalo-pelvic disproportion	33	44	18	25	17	32
Transverse lie	3	3	5	3	4	3
Other dystocia	24	23	33	34	43	28
Hypertensive diseases	10	5	10	6	15	9
Premature rupture of membranes	6	4	5	3	2	5
Other	14	11	14	6	16	13
ALL	100	100	100	100	100	100

\* Figures are the percent of cesarean sections by health facility

Source: Carine Ronsmans, May 1998

area to be covered is large, others state that surveys miss entire clusters in a country, therefore questioning the reliability of such data. Validity of women's self-report of a *C-section* is another issue. Although no articles have been found on the validity of self-reported *cesarean sections*, one investigator stated that women can confuse an episiotomy with a *cesarean section*, and the rate can be overestimated. Note also that women who have died post *C-section*, will not be counted in a population-based survey.

## D. Use and Interpretation

### 1. Is this indicator reliable?

Even with the drawbacks noted above, *C-section* data are considered generally reliable relative to other maternal health process indicators.

### 2. How can C-section rates be interpreted?

The *C-section rate* is considered a useful indicator of availability/access/use of services as well as of the functioning of the health service sys-

tem. It is considered a necessary component of quality maternal care.

### 3. What is the target level for C-sections?

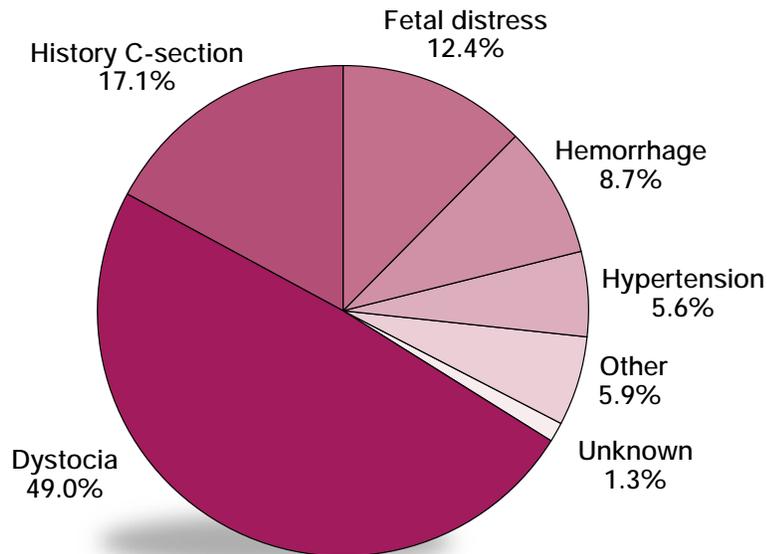
Although WHO/UNICEF have estimated a range of five to 15 percent for a population-based *C-section rate* as appropriate, the basis for these estimations continues to be questioned. A level above 15 percent may indicate too many *C-sections* being performed and below five percent may mean too few. These percentages are estimates, not evidence-based, and they should signal further investigation into the reasons the levels are high or low. The *C-section rate* indicator should not be interpreted as promotion of *C-sections* for any purpose.

Data from one health zone in Guatemala (San Marcos, 1997 to 1998), an operational health district in Cambodia, one region in Morocco, and six West African countries<sup>9</sup> show low levels of *C-sections* being provided (1.8%; 0.44%; 1.2%; and 1.7% overall with a range among the six African countries of 0.7 to 2.7%; respectively). While these data say nothing about the

<sup>9</sup> Maternal Morbidity Study [MOMA], 1998.

**Figure 2—MOMA West African Survey**

**Indications for Cesarean Section (19,845 cases)**



Source: Luc de Bernis, June 1998

appropriateness of the *C-sections* provided, de Bernis estimated the level of adequacy/appropriateness by adding those cases that should also have had a *C-section* to the existing average *C-section rate*: cases of antepartum hemorrhage and maternal and fetal death were added to the average level (bringing it to 2.4 percent), and by adding fetal distress (Apgar 2<7), the optimal level totaled 4.4 percent.<sup>10</sup> This optimum *C-section rate* for MOMA is close to the lower end of the WHO/UNICEF estimate of “appropriateness.”

A population having a *cesarean section* level within the five to 15 percent range does not

necessarily mean the *C-sections* are “appropriate.” Most often registers give no indication as to why a *C-section* was provided, and details need to be gathered from individual patient records. Some data on indications for *C-section* were provided from South Kalimantan, Indonesia (Table 3, page 11) and from the West African MOMA study (Figure 2). While it has been assumed that most *cesarean sections* in developing countries will be performed for maternal reasons, more than a tenth of the *C-sections* in the African study were for fetal distress, and nearly a fifth were for *C-section* history. It is difficult to determine “appropriateness” even with these data.

**4. What can this indicator tell us about access?**

The access to *C-section* capabilities is revealed through segmenting its use by urban/rural population. Using DHS data, the assumption that rural women have less access to referral facilities providing surgery has been shown to be correct in 13 of 16 African countries and in six of eight Asian and Middle East/N. African countries. In these countries, the ratio of *C-section* rates (urban/rural) was two or greater.<sup>11</sup> The urban to rural differences have also been shown in field data from Senegal.<sup>12</sup> In Senegal, 0.7 percent of expected births were *C-sections* (1992); however, 55 percent of those *C-sections* occurred in Dakar, the capital with a third of the country’s population.

<sup>10</sup> de Bernis, personal communication, MOMA, June 1998.

<sup>11</sup> C. Stanton, personal communication, June 1998.

<sup>12</sup> de Bernis, personal communication, June 1998.

## IV. Who delivers the woman, and where does birth take place?

### A. Definition

1. *Proportion of deliveries attended by skilled health personnel, and*

2. *Proportion of births by site*

**Numerator 1:** Deliveries by skilled health personnel (skilled delivery care, SDC) irrespective of outcome (live birth or fetal death)

**Numerator 2:** Deliveries by site (e.g., home, health center, hospital)

**Denominator (for both proportions):** All live births in the same geographic area and time frame as in numerator

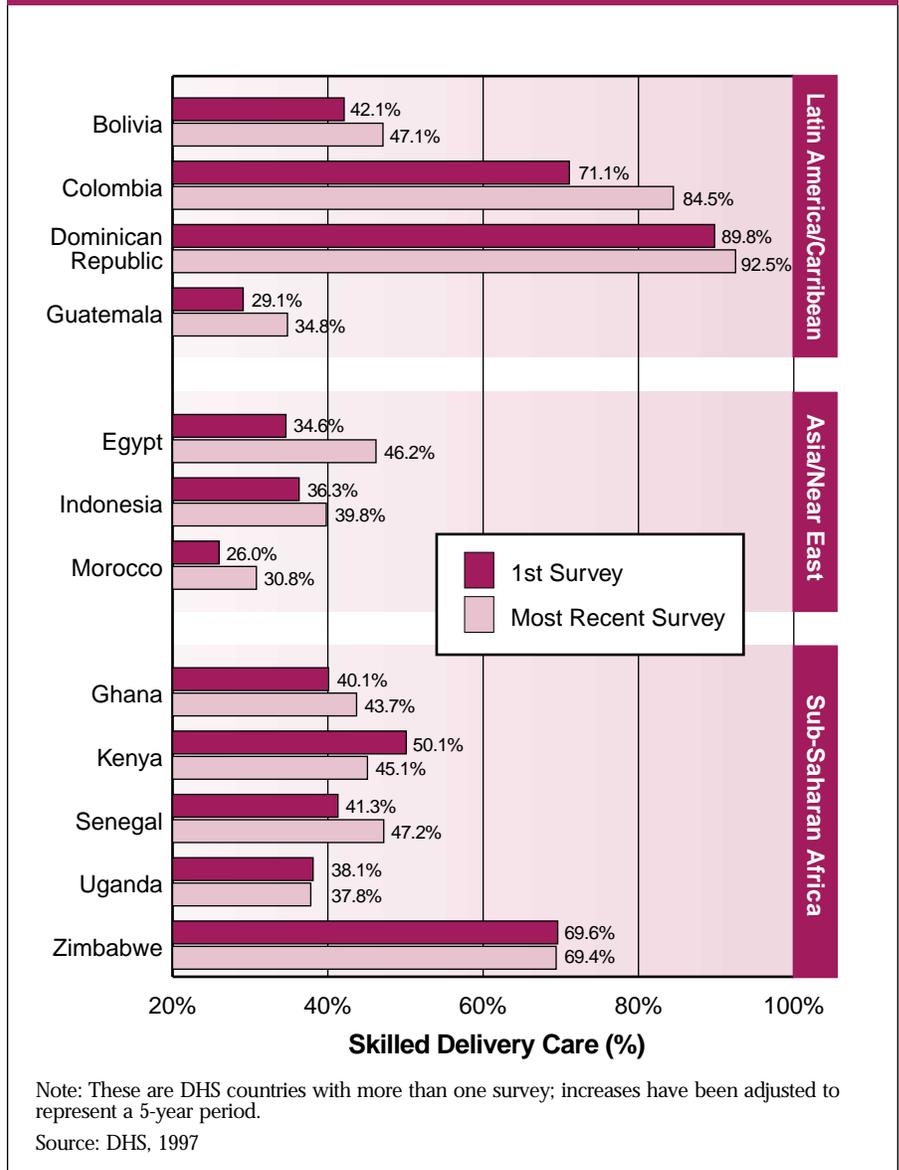
### B. Definition of Important Terms

Note that the numerators of both proportions are defined as all pregnancies, while the denominator is based on live births. While the ideal would be pregnancy-based information in both numerators and denominators, this is typically not available given that the denominator is based on live birth estimates, as above calculated, in the *Met Need* and *cesarean section rate* indicators.

#### 1. What is a skilled birth attendant?

In 1996, the WHO definition of a birth attendant changed:

**Figure 3—Adjusted 5-year Percentages of Births with Increases in Skilled Delivery Care in DHS Countries**



**1985 to 1996:** A 'trained birth attendant' includes physicians, nurses, midwives, trained primary health care and other workers, and trained traditional birth attendants.

**1996:** A 'skilled birth attendant' excludes traditional birth attendants. Their adherence to the defined standards of midwifery care is unknown. The indicator relies on countries' own requirements for midwifery

and medical personnel (i.e., it is not known how skilled the attendant is).

If these data are collected from women's self-report, it is not known if she can reliably/accurately determine skilled from unskilled providers. For example, a traditional healer may be called a "doctor," a traditional birth attendant a "sister" or "nurse," and hence be included in the "skilled birth attendant" category.

## 2. What are useful categories for the site of birth?

Distinguishing home, health centers, and hospitals provides data useful to understanding accessibility and coverage. If Basic and Comprehensive EOC facilities could be distinguished, this would be helpful (See **Policy Brief 1** for definitions). However, it is more likely that district or local hospitals will be distinguished from referral hospitals. Noting the private/public split in these facilities also helps to prepare for intervention strategies.

## C. Data Sources

In countries where public facilities provide all or the majority of care, such data may be derived from the routine health information system of the Ministry of Health. The more common source, however, is a population-based survey, such as the Demographic and

**Table 4—Utilization of Services in Less Developed Countries 1985-1996**

Services	1985	1989	1993	1996*
Antenatal Care	No data	No data	59%	65%
Skilled Delivery Care	48%	52%	55%	55%

\*In 1996, the definition of a birth attendant changed to exclude all TBAs.

Source: WHO, 1998

Health Survey (DHS). In such surveys, only women with live births are typically included.

## D. Use and Interpretation

A relatively easy set of indicators to collect, the 'who delivers the woman, and where does birth take place' indicators can be used together to determine the progression from home births with traditional attendants, to home births with skilled attendants, to facility birthing with a skilled attendant in a country/specific geographic area. Unfortunately, these two sets of data are rarely correlated to show such progression.

The use of the "who delivers the woman" indicator has been extensively used at global and national levels. WHO has shown births with skilled attendants over time among developing countries (**Table 4**). The DHS has shown the increase in use of skilled attendants in several countries (**Figure 3, page 13**), using country data for two different time periods.

# Quality of Care Indicators

## I. Case Fatality Rate (CFR)

### A. Definition

*Proportion of women with obstetric complications in a specific facility who die*

**Numerator:** Number of women with obstetric complications who die in a particular facility in a given period of time

**Denominator:** Number of women admitted to a facility with an obstetric complication or who develop a complication while in that particular facility over the same given period of time as the numerator

### B. Definition of Important Terms

#### 1. What obstetric complications should be included in the numerator and denominator?

By definition, *case fatality rates* are cause-specific. Note, however, that *all* complications are combined in both the numerator and denominator as opposed to reporting condition-specific fatality rates. This is because a relatively small number of women with any one complication are typically treated at any one facility.

The complications included in both the numerator and denominator must be the same. They are essentially the same as those listed under the broad category for the *Met Need* indicator and detailed in **Appendix 2**. By varying those included in the list, the *CFR* varies, as shown in data from South Kalimantan (**Table 5**), comparing *any* obstetric complication in the definition, with only those included in the UNICEF definition. Using data from Guatemala, the *CFR* in San Marcos with abortion complications included was 7.7 per 1000, whereas it was 15.8 per 1000 when such complications were excluded.

**Table 5—Case Fatality Rates by Health Facility\***

(South Kalimantan, December 1996 - November 1997)

	Health Facility							ALL
	Ulin	Banjar Baru	Martapura	Danau Salak	Marabahan	Kandangan	Negara	
Maternal deaths (N)	12	3	8	1	3	5	1	33**
	14	3	8	1	3	5	1	35
Obstetric complications (N)	1290	710	403	27	120	293	125	2968
	2150	1492	691	107	137	447	140	5164
Case fatality rates (%)	0.93	0.42	1.99	3.70	2.5	1.71	0.80	1.11
	0.65	0.20	1.16	0.93	2.19	1.12	0.71	0.68

\* Denominator in shaded rows = Major obstetric complication (UNICEF Definition).  
Denominator in unshaded rows = Any obstetric complication.

\*\*Two deaths due to anemia and molar pregnancy did not fall under the definition of 'major obstetric complication' and were excluded from this analysis.

Source: Carine Ronsmans, May 1998.

## C. Data Source

The source for the numerator (maternal deaths) is the facility birth/admission/discharge registers. These registers may also help to ascertain complications suffered. In Indonesia, the individual patient records were accessed to determine the cause of death in the South Kalimantan facilities and were found to be very poor. The admitting diagnosis had to be used where other records were not available.

## D. Use and Interpretation

### 1. Can this indicator be used to compare the quality of care among facilities?

This is an indicator developed for measuring quality of care in one facility over time. Comparing the *CFRs* among different types of hospitals is not useful given the differences among the clientele admitted to hospitals (mild complications may be managed at district hospitals, whereas severely complicated cases may go to the referral provincial hospital for management). While it is thought possible to compare like hospitals, no report of such comparison has yet been found.

### 2. Can this indicator be used to look at specific complications?

Yes, if the number of complicated cases treated is large enough. An example of this comes from the King Baudouin Health Center in Senegal (Table 6). However, more useful than the rates are the absolute numbers in the numerator and denominator. They show that in the King Baudouin Health Center, hemorrhage causes the greatest numbers of cases and deaths, although other problems (anemia and sepsis) have higher *CFRs*. Both the absolute numbers and the rates focus attention on further training or supervision for particularly difficult or poorly managed complications. Setting priorities for these interventions depends on the numbers and the feasibility given the resources available.

### 3. What is the target for the *CFR*?

Although WHO and UNICEF have quoted a maximum acceptable level of one percent as the target for the *case fatality rate* based on a study in the US, they also advise that it is more important to progressively reduce the *CFR*.

### 4. How can the *CFR* be interpreted?

Based on the experience of the Prevention of Maternal Mortality Network and others, a high *CFR* can be interpreted best by using it in conjunction with other indicators of quality at the facility: time interval from admission to treatment; condition of woman upon admission (temperature, blood pressures, pulse rate), and the causes of maternal death in the facility over the year. While no examples of the former indicators were reported, Table 7 provides the causes of maternal death among obstetric hospital admissions in South Kalimantan, Indonesia. Of the 35 deaths in 1996 to 1997, over half were due to hypertensive disorders of pregnancy. This signals the need for further efforts to decrease this specific problem in order to decrease the overall *CFR*.

Other indicators may help to understand the hospital's status for a specific geographic area, such as:

- ◆ the percent of births in a hospital and at other sites (home, other hospitals),

**Table 6—Baudouin: Direct Obstetric Morbidity & Case Fatality Rates**

Obstetric Morbidity	N	Total deliveries (%)	Deaths	CFR(%)
Hemorrhage	189	3.2	19	10.0
Dystocia	106	1.7	9	8.5
Hypertension	115	2.0	13	11.3
Sepsis	4	0.06	1	25.0
Anemia	11	0.2	4	36.4
Total	425	7	41*	9.6

\* Five women suffered more than one obstetric morbidity.

Source: Luc de Bernis, June 1998.

- ◆ where the maternal deaths occur (home, health center, district hospital, provincial hospital), and
- ◆ the causes of death at the facility as well as at other sites (e.g., through a Maternal Death Audit).

Through the use of these other indicators, it may be possible to provide some programmatic understanding for each hospital.

There are some hospitals where no or very few maternal deaths happen in a year. This is not necessarily because the quality of care is high but because few women with complications use that facility. In such circumstances, the *CFR* is not a useful indicator.

## II. Referral Rates

### A. Definition

*Proportion of women with potential or actual obstetric complications moving from one level of care to another (e.g., community to basic EOC facility or to comprehensive EOC facility)*

**Numerator:** Number of women with a potential or actual obstetric complication moved to another site for care

**Denominator:** Number of all women with obstetric complications (or deliveries or live births) in the same area and within the same time frame as in the numerator

### B. Definition of Important Terms

There are many types of referral possible, including those from the family directly, or between facilities:

#### 1. Self/family referral to:

- TBA/CHW\*
- First level skilled health care provider
- Basic EOC facility
- Comprehensive EOC facility

\* Community Health Worker.

**Table 7—Causes of Maternal Death Among Obstetric Hospital Admissions, South Kalimantan, Indonesia**

Causes*	Number
<b>HDP</b>	
Eclampsia	15
Pre-eclampsia	3
<b>Hemorrhage</b>	
Postpartum hemorrhage/retained placenta	5
Placenta previa	1
<b>Dystocia</b>	
Prolonged 2nd stage	4
Dystocia due to fetal malpresentation	1
Past C-section	1
Uterine rupture	1
Anemia	1
Molar	1
Abortion	1
Unknown	1
<b>TOTAL</b>	<b>35</b>

\* Based on type of complications during hospitalization.  
Source: Carine Ronsmans, May 1998.

#### 2. TBA/CHW to:

- First level skilled delivery care provider (SDC)
- Basic EOC facility
- Comprehensive EOC facility

#### 3. First level SDC to:

- Basic EOC facility
- Comprehensive EOC facility

#### 4. Comprehensive EOC facility to:

- Tertiary center

Given these variations, the indicator could be population-based (data gathered through surveys), or facility-based (data gathered from registers). The referral rate could focus on either women referred from a site or received at a site due to referral.

## Numerator

The focus of the numerator is on women with actual complications. It is not known how to estimate women with potential complications unless risk factors, such as women with previous poor pregnancy outcome or high multiparity, are used. Use of such risk factors has not proved of predictive value, and the present thinking is to count only those women with complications diagnosed by a provider. See the notes under the *Met Need* indicator to determine which complicated cases to include in both the numerator and denominator.

If the numerator is captured through a population-based survey using women's self-report of complications, the resulting numerator is actually "women with perceived complications" rather than with biomedically valid complications (see *Statement from a Task Force Meeting on Validation of Women's Reporting of Obstetric Complications in National Surveys*).

## Denominator

Gathered at community level, the denominator is anticipated to be all live births, although "all women with complications" could be calculated as in the denominator for the *Met Need* indicator. For the latter, the comments under *Met Need* are relevant regarding the complications included.

Obviously if the data are being drawn from a birth register for a facility-based *Referral Rate*, the denominator could be all deliveries in the facility, or all women with complications as diagnosed in the facility.

## C. Data Sources

Several sources can provide data on referrals in the community or at a specific facility:

- ◆ health facility registers
- ◆ antenatal cards
- ◆ delivery records
- ◆ vehicle log books

- ◆ special referral forms
- ◆ community surveys
- ◆ community data collection systems

## D. Use and Interpretation

### 1. What does the Referral Rate measure?

*Referral Rates* indicate both access and quality of care in a particular facility. They contribute to the evaluation of communications campaigns aimed at improving referral at the community level (self-referral, or by TBA/CHW).

### 2. What affects Referral Rates?

A variety of factors are known to affect *Referral Rates*, including the perceived quality of care at the Basic and Comprehensive EOC facilities, availability of transport, costs of transport and of services at the referral site, the population's knowledge of complications and referral sites, linkages between service levels and mechanisms that affect referral (e.g., prenatal care referral), and special attention to referral needs (e.g., maternity waiting homes).

### 3. How can Referral Rates be analyzed?

Experience with *referral rates* is minimal. The most useful information has come from registers at the facility level for a defined group of conditions or for a single complication. They can be expressed as a percent of deliveries or of women with complications in the facility. Rates are not likely to be useful for comparison across facilities, districts, or countries.

Increased referrals are a positive feature if they signify an increased recognition of life threatening conditions, improved decision making at community and Basic EOC levels, response to removal of barriers (payment schemes, transport mechanisms, waiting homes), or a previous low level of utilization. **Table 8** compares hospital referrals in San Marcos, Guatemala. Time 1 and 2 signify before and after TBA training on appropriately managing or referring a complicated case. In Time 2, overall referrals increased, with the increase for referrals com-

**Table 8—San Marcos: Referral Rates (%)  
Time 1 and 2 by Complication Status  
at a Comprehensive EOC Facility**

	Time 1 (1995-6)		Time 2 (1997-8)	
	with	w/o*	with	w/o*
Referred (%)	24	34	40	44
TBA	13	18	12	18
Center	10	16	7	13
Other	<1	<1	21	13
"Self" referred	76	66	60	56
Total	100	100	100	100

\* Without complication

Source: Patsy Bailey, 1998

ing from the "other" category. That category was used if the woman used more than one referral point prior to the hospital (e.g., TBA + Health Center). While the increase in total referrals is good, distinguishing complications from normal conditions continues to be a problem as referrals for women with and without complications both increased. Also, referrals are now going through a longer pathway, using

more than one referral point.

Increased referrals are negative, however, if they correspond to bypassing the Basic EOC level for such reasons as, loss of key personnel at Basic EOC level, fear of complaints at the Basic level, diminishing resources at Basic level, or inappropriate criteria for referral.

Decreased referrals at the Comprehensive EOC referral point are a positive feature if there are increased skills at the Basic level, or a previous overload at the Comprehensive level (see **Table 9** based on referrals sent from a rural maternity center in Morocco

before and after EOC training at the rural maternity center). Decreased referrals are a negative feature if they represent a loss of confidence in the Comprehensive level, rupture of the transport system, or unaffordable costs. (Note that **Table 8** was looking at referrals received at a Comprehensive EOC facility and **Table 9** at referrals sent out from a Basic EOC facility.)

**Table 9—Rural Maternity Center Referrals in Morocco**

	Before EmOC Training—1996 <i>Total deliveries = 352</i>				After EmOC Training—1997 <i>Total deliveries = 324</i>			
	Not Referred	Referred	Total	% Referred	Not Referred	Referred	Total	% Referred
Postpartum Hemorrhage	3	18	21	86	14	13	27	48
Postpartum Infection	22	0	22	0	7	0	7	0
Dystocia	13	49	62	79	31	8	39	21
Toxemia	1	1	2	50	2	2	4	50
Manual removal of placenta	16	1	17	6	16	0	16	0
Abortion complications	16	1	17	6	19	3	22	14
<b>TOTAL</b>	<b>71</b>	<b>70</b>	<b>141</b>	<b>50</b>	<b>89</b>	<b>26</b>	<b>115</b>	<b>23</b>

Source: Elizabeth Goodburn, 1998

40% of all deliveries had complications  
20% of all deliveries were referred  
50% of all complications were referred

36% of all deliveries had complications  
8% of all deliveries were referred  
23% of all complications were referred

#### ***4. What is an appropriate referral?***

From the data collected in registers, it is difficult to determine the “appropriateness” of a referral. By comparing referrals for any delivery, with referrals for complications (as determined by the providers at the referral site) over time, it is anticipated that more “appropriate” referrals can be seen (Table 9 for San Marcos, Guatemala, shows that even with TBA training, improving the “appropriateness” of referral is difficult).

However, if there is an increase in referrals, this trend may generally be considered good. Labeling normal deliveries that are referred as “inappropriate referrals” may discourage providers from looking for and referring women with early signs of complications.

#### ***5. Can we tell how the referral was made?***

Experience to date from the MotherCare/ Indonesia project, where birth registers include

who referred the patient, does not allow us to determine the chain of referral. The registers could only provide the place/person who *last* referred the patient, not the chain of referral. Where there are several possible avenues for referral (as described above), it is not clear how to determine the actual referral chain followed by women.

In the Safe Motherhood Survey in the Philippines,<sup>13</sup> a population-based survey, many questions were needed to identify the many referral pathways a woman could follow. Analysis proved impossible due to the small cell sizes that resulted.

An alternative to acquiring this indicator through the registers or surveys is to pursue individual case histories. Case histories could elaborate the full referral pathway by following back those women at the facility who state they have been referred.

<sup>13</sup> National Statistics Office, Manila, Phillipines; *National Safe Motherhood Survey, 1993*; Macro International, Inc., Calverton, MD; October 1994.

# Conclusions

1. **The birth register, or delivery room register, is the primary source of information for both the access and quality of care indicators** described in this *MotherCare Matters*, with two **important exceptions—the cesarean section rate, and where women deliver and with whom**. A workshop to determine the state-of-the-art, experience, and research to improve birth registers was held March 2 to 5, 1998, in Washington, DC, sponsored by the Measure Project. Cindy Stanton (Measure/Evaluation Project, Macro International, Inc., 11785 Beltsville Drive, Calverton, Md., 20705) will be printing the workshop report soon. Reports can also be requested via: reports@macroint.com
2. Typically, **three columns need to be added to an already existing birth register** in order to collect the indicators to monitor a project, as described here: one for complications suffered, one for the geographic area where the woman lives (e.g., district, province), and another for the source that referred the woman. Adding these columns and training the providers to use them, however, is an intervention in itself.
3. Standardizing the complications for the column so labeled is challenging, and its long-term use questionable. While **the classification of complications to be used in the register should be standardized** with the facility protocols/norms in order to increase validity and accuracy among providers, this has proved difficult to do. Different providers use the register, and training to record complications only as diagnosed in the protocols has met with short-lived success, at least in MotherCare's hands in South Kalimantan. With low staff turnover and increased use of the data collected, the quality of the data on complications recorded should improve over time, but poor quality data may continue to be a limitation.

The list of complications to be included should be prepared at initiation, and all providers made aware of the complications to be reported.

4. The address of the woman is important to know if the interventions to improve Safe Motherhood are localized (as in a project). Many women move to another area near the time of birth, to be near their own family (e.g., mother) or a specific facility. **Asking the woman, where she usually lives, versus where she is living now**, may help distinguish her permanent home address.

If a program covering a wide geographic area and large population is being monitored (rather than a localized project), the use of the address is questionable, as the various indicators of access may cover total access in a geographical area, versus to a specific facility.

5. If a project's performance is being monitored/evaluated, **the "referred by whom" column is needed if referral is an intervention** in the project. Yet interpretation of the data collected can be confusing when there are several possible referral points—community members, health center, local hospital. Usually such data only capture the last referral point. Hence the referral rate may be more useful in sites where there are only two levels of care (e.g., home with a TBA, or at a local hospital). Case histories of referred women may be more illuminating about the referral pathway..
6. **The experience with access indicators is greater than with quality of care indicators for Safe Motherhood**. Where most women deliver at home with unskilled birth attendants (traditional birth attendants, family members, or neighbors), the numbers of women with complications or deaths in facilities is too small for the *case fatality rate*

to be useful. The numbers of women admitted and dying by type of complication has proved more useful than the CFR. Perhaps by using the CFR with other indicators from the facility, or from the geographic area, may increase the usefulness of this indicator. Much more experience is needed with all the process indicators, but in particular those for *quality of care*. Alternatives to those discussed here would be welcome.

7. **One such alternative is the Maternal Death Audit** used at a facility. Audits have been used to point to quality of care gaps at facility level. If broadened to include a commu-

nity diagnosis of delay problems prior to facility admission, the Maternal Death Audit may be helpful in determining access gaps as well. The topics pursued by such a methodology may increase its usefulness. Perinatal deaths, specific maternal complications, or cases requiring cesarean section could be followed and could augment the information on maternal deaths. References for the Maternal Death Audit are included in the **General References**.

**Policy Brief 2** offers a summary of this article's key elements on the process indicators.

## General References

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### Maternal Indicators

Cambell, O., V. Filippi, M. Koblinsky, T. Marshall, T. Mortimer, R. Pittrof, C. Ronsmans, L. Williams. 1997. *Lessons Learnt: A decade of measuring the impact of safe motherhood programmes*. London: LSHTM.

Ronsmans, C., A. Achadi, G. Supratikto, A. Zazri, J. McDermott (In Press). Use of hospital data for Safe Motherhood Programmes in South Kalimantan, Indonesia. *Tropical Medicine and International Health*.

### Maternal Death Autopsies/Audits

WHO. 1995. *Verbal Autopsies for maternal deaths: Report of a workshop, London, 10-13 January 1994*. Geneva: WHO.

Ronsmans, C., AM. Vanneste, J. Chakraborty, JA. Van Ginneken. 1998. A Comparison of three verbal autopsy methods to ascertain levels and causes of maternal deaths in Matlab, Bangladesh. *International Journal of Epidemiology* 29: 660-666.

## Statement From a Task Force Meeting on Validation of Women's Reporting of Obstetric Complications in National Surveys

ON SEPTEMBER 16 AND 17, 1996, a task force meeting, organized by the MotherCare Project and the Demographic and Health Surveys (DHS) Program, was held to review results of six studies seeking to validate women's self-reporting of major obstetric complications. A major goal of the meeting was to determine, as a group, the usefulness of asking women questions on signs and symptoms of obstetric complications using survey methods. As a group we agreed that four postulated uses of such data would include: 1) estimating the population prevalence of these complications; 2) identifying women who needed medical evaluation; 3) identifying women who perceived they had a problem; and 4) studying women's reported behavior in the context of a perceived problem. Knowledge of the validity of women's reporting of complications is most relevant for the first two of these objectives.

### Conclusions

1. The focus of these studies was on broad categories of maternal complications including dysfunctional labor, hemorrhage, sepsis, and eclampsia. Estimations of the population prevalence of these problems, based on interview data collected in national surveys, are not likely to be valid (e.g., accurate when comparing self-report with medical records) or reliable. Estimations based on data from in-depth, more focused community studies may be more accurate. (See no. 4 under general findings below.)
2. In large scale surveys, women's retrospective self-report of complications is not an accurate means of estimating the proportion of women who needed medical treatment for obstetric complications.
3. It is possible and useful to ask about women's perceived problems if questions on seeking health care are also asked. The main objective of this line of questioning is to learn about health care seeking behavior in the context of a perceived problem. Because such results would be interpreted in the context of the woman's perception that she had a problem rather than as a medically defined problem, validation of reporting would not be necessary. The resulting indicator proposed would be:

#### **Women who sought care**

#### **Women with a perceived problem**

Such an indicator would not be sufficient for the purpose of monitoring safe motherhood programs. There is a strong need to explore other indicators, such as coverage of obstetric care, which may better capture changes in access to and quality of essential obstetric care.

4. The context of data collection should be considered in assessing the usefulness of data obtained. In this light, community surveys differ from nationally representative surveys in ways that might affect both the validity and reliability of responses. For example, in large-scale surveys conducted in countries with multiple languages and ethnic groups, time and financial resources often pose significant constraints. These constraints make it less feasible to conduct the in-depth qualitative research that is needed in each language and culture group to assure appropriate conceptualization, wording, and translation of

*continued on next page*

## Task Force Statement—Continued

questions for a standardized questionnaire. In addition, large sample sizes often necessitate the employment of many interviewers which complicates training and supervision of data collection in ways that prevent the required degree of attention to detail. And in multi-purpose, DHS type surveys, many widely varying subjects are covered in the questionnaire, thus limiting the time allowed for special training on any one topic.

### Implications

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1. Data from national surveys should not be used to indicate whether women who had a medically defined complication are seeking medical care. Such surveys are thus more worthwhile if focused on knowledge, behavior, and perceptions.
2. The standards applied here to the study of obstetric complications in surveys are somewhat higher than has been used in the past for some other types of morbidity. Justification for this more rigorous approach is based on our desire to avoid the use of indicators that are likely to give an inaccurate picture of program impact. Based on the preliminary results of these studies, we believe, in general, that women's self-reporting of obstetric complications in large scale surveys should not be the basis of indicators of program failure or success.

Finally, we would note that this statement is based on the preliminary findings from these studies and that more in-depth insights will be forthcoming when the final results are published.

### *Investigators (and funding source for the study)*

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<b>Benin</b>	Veronique Filippi, London School of Hygiene and Tropical Medicine (study funded by the British Overseas Development Administration)
<b>Bolivia</b>	Kathleen O'Rourke, University of Texas (study funded by USAID through MotherCare/JSI)
<b>Ecuador</b>	Isabella Danel, Center for Disease Control (study funded by USAID through MotherCare/JSI)
<b>Ghana</b>	Nancy Sloan, Population Council (study funded by Canadian CIDA and the World Bank)
<b>Indonesia</b>	Carine Ronsmans, London School of Hygiene and Tropical Medicine (study funded by USAID through MotherCare/JSI)
<b>Philippines</b>	Kate Stewart, Demographic and Health Surveys, Macro International (study funded by USAID through MotherCare/JSI and DHS)
<b>Other members</b>	of the task force include Fariyal Fikree (Aga Khan University), Marjorie Koblinsky (MotherCare/JSI), Jeanne McDermott (MotherCare/JSI), Mary Ellen Stanton (USAID/Washington), Cindy Stanton (DHS/Macro International), and Elisabeth Sommerfelt (DHS/Macro International)

## Appendix 1

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### List of Participants

Maternal Health Indicators Meeting—June 1-2, 1998  
MotherCare/John Snow, Inc., Arlington, VA

1. Endang Achadi  
*MotherCare/Indonesia*
2. Patsy Bailey  
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3. Elizabeth Bocaletti  
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## Appendix 2

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### Definitions of Obstetric Complications

#### *UNICEF, WHO, UNFPA*

Hemorrhage - Antepartum, post-partum

Prolonged/obstructed labor

Post-partum sepsis

Complications of abortion

Pre-eclampsia, eclampsia

Ectopic pregnancy

Ruptured uterus

#### *MotherCare*

##### **Hemorrhage**

- Placenta previa
- Abruptio placenta
- PPH (post-partum hemorrhage)
- Retained placenta
- Everted/inverted uterus
- Ectopic pregnancy
- APH/IPH (antepartum/intrapartum hemorrhage)

##### **Dystocia**

- Prolonged first stage of labor
- Prolonged second stage of labor
- CPD (cephalo-pelvic disproportion)
- Uterine rupture
- Malpresentation (breech, transverse, etc.)

##### **Sepsis**

- Infection

##### **Abortion**

- Calculate Met Need with/without abortion

##### **Hypertensive Disease of Pregnancy**

- Eclampsia
- Severe pre-eclampsia

included with **Hemorrhage**

included with **Dystocia**

##### **Other**

- Severe anemia (Hb<7 or equivalent)
- Multiple gestation
- Embolism

##### **Not to be included**

- Premature rupture of membranes
- Sexually Transmitted Disease (STD)
- Postmaturity/post dates
- False labor
- Medical complication
- Hyperemesis gravidarum
- Preterm labor

## *A Tribute to Heinz Berendes*

Heinz Berendes, Director of the Epidemiology Statistics and Prevention Research Division of NIH's National Institute of Child Health and Human Development, died of prostate cancer on May 6, 1999.

With a past studded with awards for outstanding service and leadership in contraceptive safety and perinatal health, Heinz is best known to MotherCare for his guiding and nurturing hand in studies to elucidate the levels and determinants of maternal mortality in the four quadrants of Pakistan. These initial studies laid the foundation for two demonstration projects funded by MotherCare. One project is in rural Balochistan with the Asia Foundation, now funded by NICHD and UNICEF (principal investigator: Dr. Farid Midhet), and another is in a poor urban settlement in Karachi with the Aga Khan University (principal investigator: Dr. Fariyal Fikree). Heinz was a mentor to Drs. Midhet and Fikree, providing opportunities at NICHD for them to critically assess and improve their research.

MotherCare will remember Heinz for his commitment to capacity building for research in Pakistan. Heinz was a friend, first and foremost, a skilled researcher, and a leader. His gentle support and guidance are sorely missed by all who knew him and had the pleasure to work with him.

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This issue of **MotherCare Matters** is a report of a meeting on project/program indicators for Safe Motherhood, by Marge Koblinsky. The results reflect the contributions and insights of the listed participants of the meeting (Appendix 1) whose participation and follow up has been much appreciated.



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