

## **ISSUES IN PROGRAMMING FOR SAFE MOTHERHOOD**

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## Abbreviations and Acronyms

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
BEOC	Basic Essential Obstetric Care
BMC	Basic Maternity Care
CARE	Cooperative for Assistance and Relief Everywhere
CDC	U.S. Centers for Disease Control and Prevention
CEOC	Comprehensive Essential Obstetric Care
CHC	Community Health Center
CNM	Certified Nurse Midwife
CPR	Contraceptive prevalence rate
DHS	Demographic and Health Survey
EmOC	Emergency Obstetric Care
EOC	Essential Obstetric Care
FCMC	Family-centered Maternity Care
GTI	Genital Tract Infection
Hgb/Hb	Hemoglobin
HIV	Human Immunodeficiency Virus
ICM	International Confederation of Midwives
IEC	Information, Education and Communication
IFA	Iron/Folic Acid
INACG	International Nutritional Anemia Consultative Group
IPCC	Interpersonal Communication and Counseling
JSI	John Snow, Incorporated
KAP	Knowledge, attitudes and practices
LAM	Lactation Amenorrhea Method
LBW	Low birth weight
LSS	Life Saving Skills
MAQ	Maximizing Access and Quality
MCH	Maternal and Child Health
MISS	Maternal-Infant Supplementary Study
MMR	Maternal Mortality Ratio
MPA	Maternal and Perinatal Audit
MOH	Ministry of Health
MOHP	Ministry of Health and Population
NGO	Non-governmental organization
OB	Obstetrics
OR	Operations research
PAC	Post-Abortion Care
PHC	Primary Health Center
PHR	Partnership for Health Reform (USAID Project)
PID	Pelvic inflammatory disease
PMM	Prevention of Maternal Mortality Network Program
PVO	Private voluntary organization
QA	Quality Assurance

QOC	Quality of Care
RH	Reproductive Health
SBA	Skilled Birth Attendant
STD	Sexually transmitted disease
STI	Sexually transmitted infection
TA	Technical assistance
TBA	Traditional Birth Attendant
TFR	Total Fertility Rate
TWG	Technical Working Group
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

## Introduction

In this booklet, we present select issues in programming for Safe Motherhood derived from collected data in the field. Our purpose is to examine past experience from a practical programming perspective.

The data to support this purpose are not extensive. Nevertheless, there are helpful lessons to be learned from projects and country programs that predate the Safe Motherhood Initiative, as well as those initiated since the landmark Nairobi conference launched the Initiative in 1987. Specifically, we draw heavily from historical case studies of country programs, our own experience in MotherCare (active since 1989), the Demographic and Health Surveys, and a host of smaller, single-country and multi-country studies.

This Issues document begins with *what the problem is* concerning maternal and perinatal mortality and morbidity, looking at the magnitude of maternal death and disabilities and their consequences, not only for the mother but also for the perinate. It then moves to *what the general interventions* are to address these problems and the timing of these interventions. To reduce maternal and newborn mortality, *Essential obstetric care* and its subsets, emergency (*EmOC*) and basic essential obstetric care (*BEOC*), are then described, along with the evidence for the provider *who can provide essential obstetric services*.

Evidence of *how to intervene* and issues surrounding these interventions is presented, with the available data covering:

- Improving the quality of care of skilled birth attendants
- Facilitating use of a skilled birth attendant for safe delivery
- Increasing the met need for those with complications
- Packaging these services: Lessons from the history of successful countries,
- Costs of services for maternal health, and of the different structures that provide care
- Measuring program progress
- Promoting policy for the use of the skilled birth attendant

References and notes are provided in the back of the document.

## **The Context: Maternal and Perinatal Morbidity, Mortality and Their Consequences**

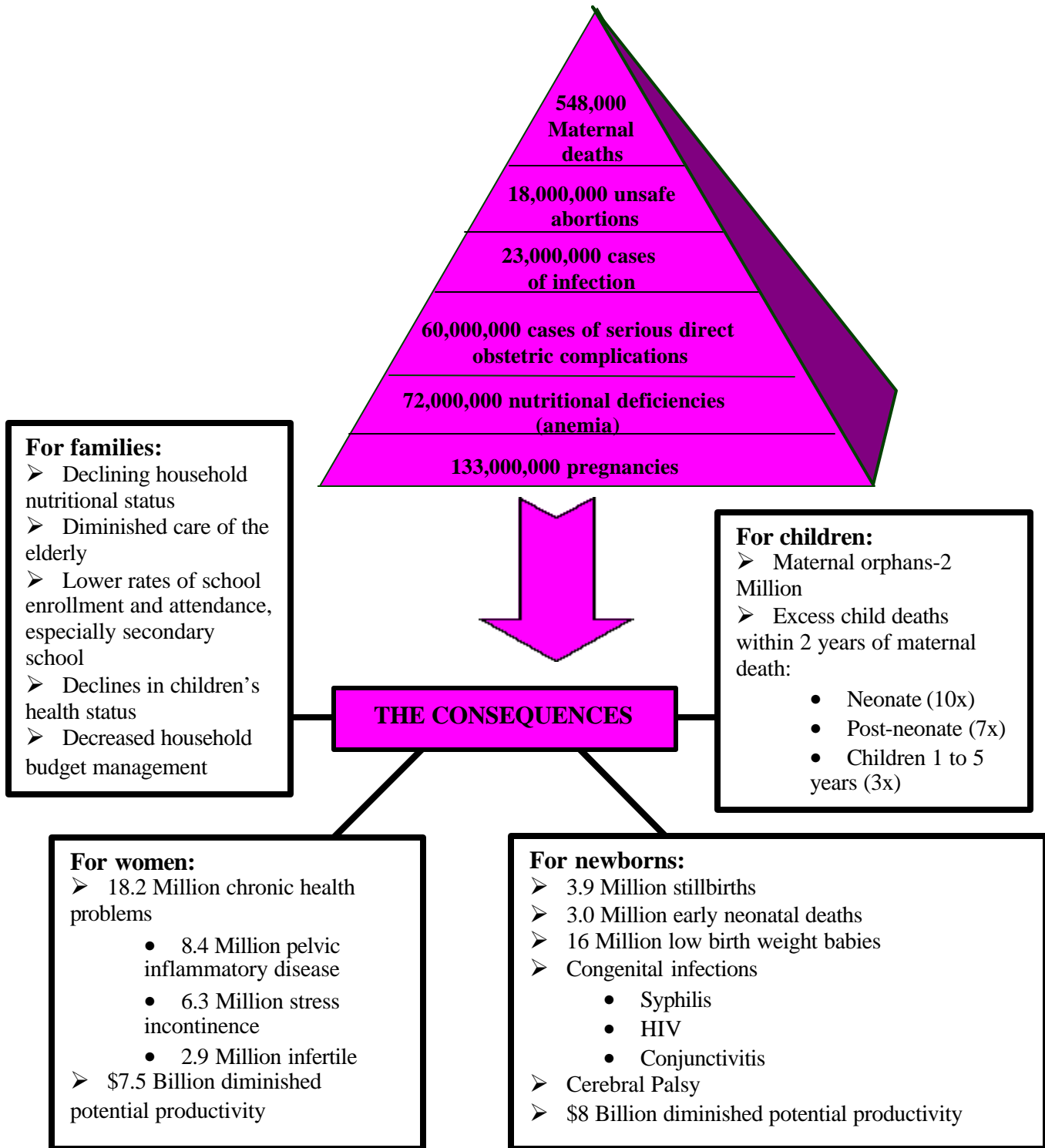
### **1. Magnitude and Consequences**

In the year 2000, about 548,000 women will die in developing countries, from pregnancy-related causes.<sup>1</sup> The majority of these deaths (75%) are due to direct obstetric complications—hemorrhage, sepsis, hypertensive disorders of pregnancy, obstructed and prolonged labor, and unsafe abortion. These deaths, shocking in their own right when compared with the low levels of maternal deaths in developed countries (about 3000), are only the tip of the iceberg: women suffer poor reproductive health (nutritional deficiencies and infections) going into pregnancy and experience further complications and other disabilities during pregnancy, labor and delivery and in the postpartum period (figure 1).

The consequences of this burden of ill health impacts on women as well as on the fetus and newborn. Over 18 million women each year endure chronic disabilities as a result of their pregnancy, most notably pelvic inflammatory disease, stress incontinence and infertility. Moreover, their potential productivity is diminished by over \$7 billion, primarily due to death, malaria, anemia and the consequences of obstructed labor—fistula and stress incontinence.

The impact is as dramatic and extensive for the newborn: 6.9 million perinates die (stillbirths or early neonatal deaths) due to the same complications that kill the mother, her poor reproductive health prior to and during pregnancy, and management at delivery and in the first week of life.<sup>2</sup> Low birth weight, experienced by about 14% of live births each year, or 16 million babies in the year 2000, puts the baby at risk of more frequent developmental delays, disabilities, and early death. Potential productivity for the child is diminished by at least \$8 billion due to iodine deficiency alone.<sup>1</sup> Moreover, with HIV, the numbers of those experiencing many of these problems are likely to increase.

**Figure 1: Reproductive Health in Pregnant Women and its Consequences, Developing Countries 2000**





## 2. When do deaths occur?

- *Maternal Deaths*

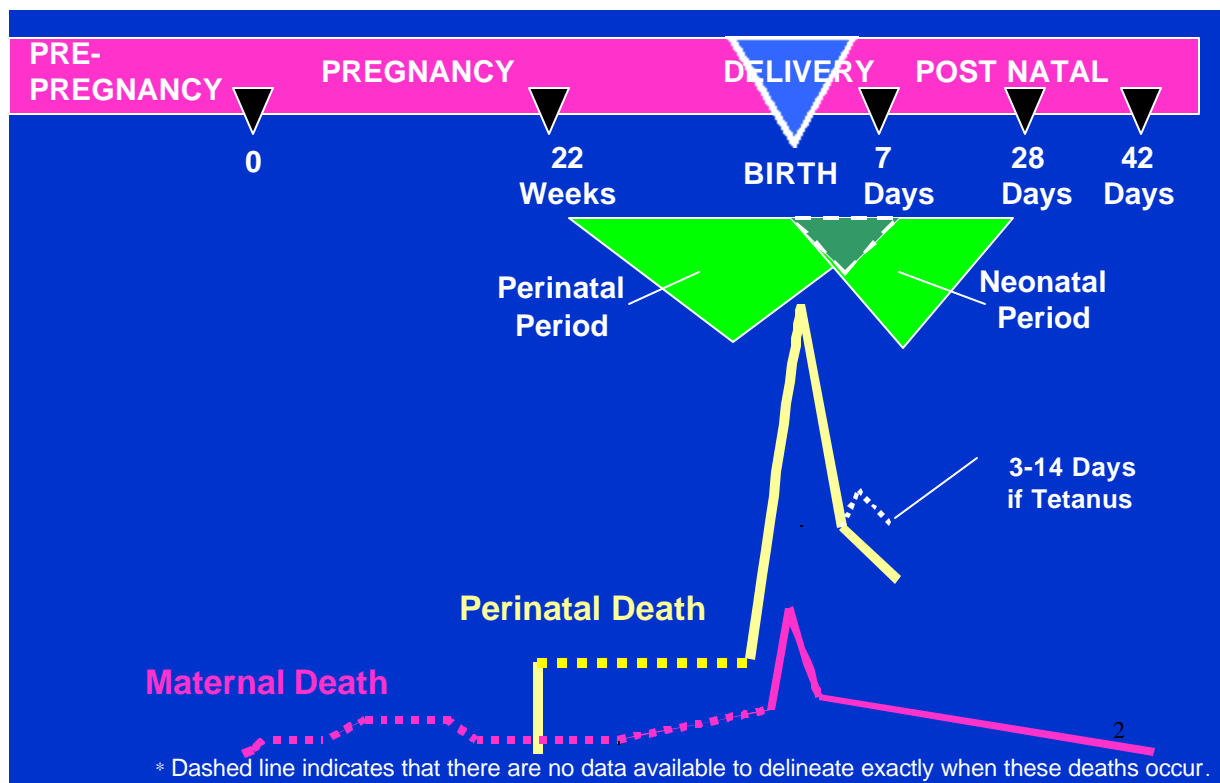
More than one in four maternal deaths in developing countries occur during labor and delivery and in the 24 hours post-delivery (figure 2). This rate of death is higher than for any other 36-48 hour period during the nine-months of pregnancy and 42-days postpartum.<sup>3</sup> Two in four maternal deaths occur from the onset of labor to the end of the first week post-delivery.<sup>4</sup>

Most of the deaths during this short period are due to hemorrhage and eclampsia while septic deaths usually occur after 7 days postpartum.

- *Perinatal Deaths*

Like maternal deaths, perinatal deaths are highly concentrated around the time of birth. Approximately 46 percent of perinatal deaths occur during labor and delivery or within the first 24 hours after birth (figure 2).<sup>5</sup> This rate of death is more than any other 36-48 hour time frame during the perinatal period (encompassing the time from 22 weeks *in utero* to 7 days postpartum). The main direct causes are usually identified as prematurity, infection, and asphyxia.

**Figure 2: Timing of Maternal and Perinatal Mortality**



### **3. What services are needed for a healthy mother and newborn?**

There is general consensus on the biomedical interventions key to reducing mortality and improving health for mothers and newborns in resource-poor environments.<sup>6</sup> When grouped together for their effect on pregnancy outcome for mother and newborn, they fit into the following categories:

- optimal timing of pregnancy
- optimal nutritional status
- prevention and control of infection
- elimination of toxins
- safe delivery
- postpartum and newborn care
- essential obstetric care to manage obstetric and newborn complications

To prevent death of both mother and newborn, the focus must be at labor, delivery and the immediate postpartum period -- from the onset of labor through day 7. Ideally, attention to nutrition and infection control, as well as life style/environment interventions, should be implemented prior to, as well as during and after, pregnancy (figure 3).

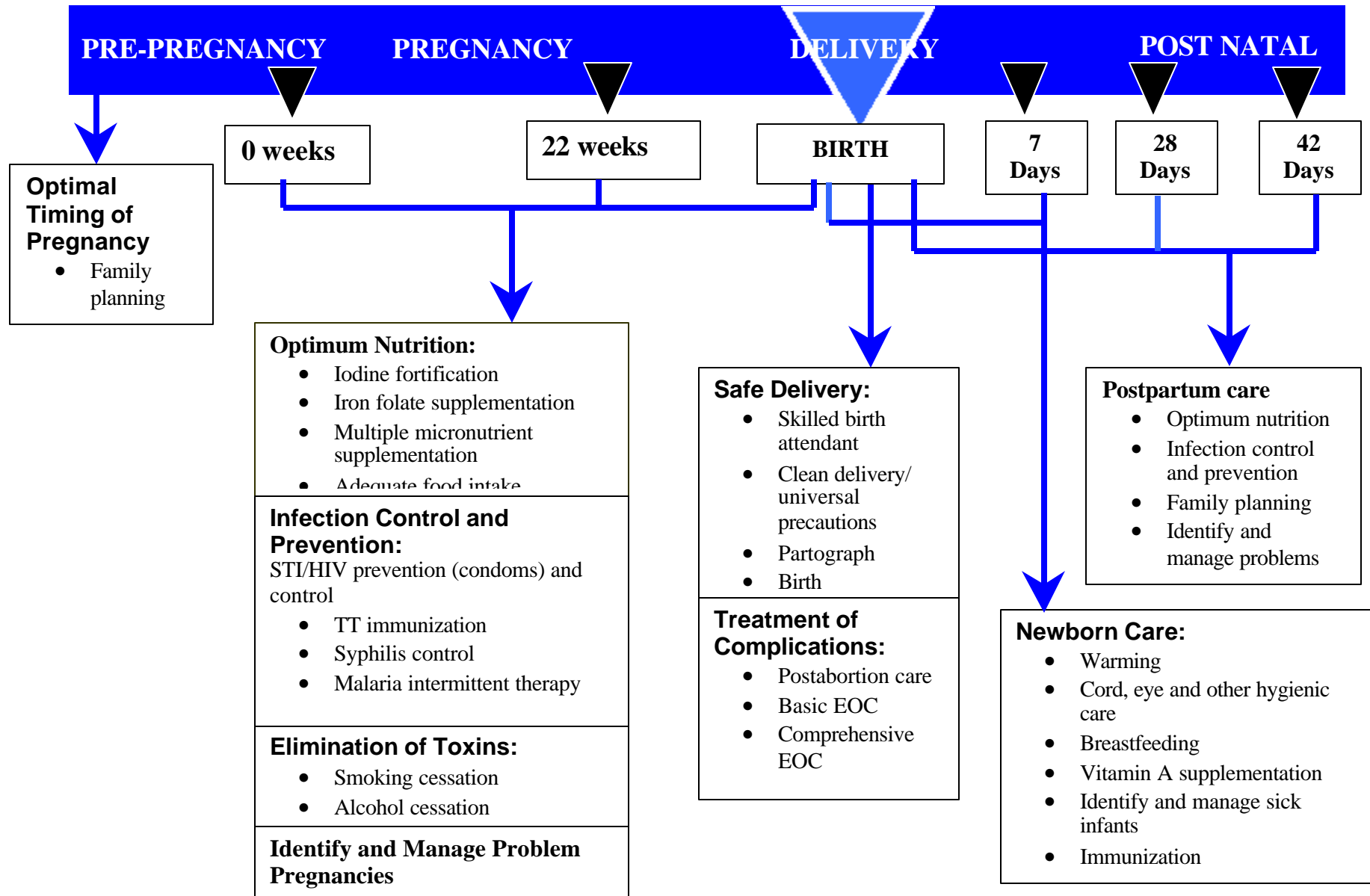
### **4. What is the “best buy” for resource-poor settings?**

Decisions about which interventions to choose need to be based on a variety of considerations:

- **Epidemiology**
- **Effectiveness and cost of interventions**
- **Health system infrastructure**
- **Community characteristics and birthing traditions**
- **Funding resources**
- **Policy considerations**

The following sections address issues in many of these areas.

**Figure 3: Services for a Healthy Mother and Newborn**



## **Safe Motherhood: Services for Mortality Reduction**

### **1. What services must be provided for safe motherhood?**

*Essential Obstetric Care (EOC) contains the essential service components to provide for a safe birth and for management of complications for both mothers and newborns (table 1).*

First articulated in 1985, the service package needed to reduce maternal and newborn deaths is now called Essential Obstetric Care or EOC. **EOC** (or Comprehensive essential obstetric care [CEOOC]) provides the means to manage maternal and newborn complications when they happen, as well as the procedures to detect and treat problem pregnancies early, preventing their progression to an emergency for the mother and newborn. ***Ultimately the full set of services of EOC needs to be implemented.*** Providers clinically trained in midwifery are needed to provide the bulk of these services supported by obstetricians and gynecologists.

### **2. In which subset of EOC should programs invest first?**

*Basic Essential Obstetric Care needs to be in place prior to Emergency Obstetric Care. EmOC is advanced obstetrics and must build on basic obstetric care.*

There has been controversy as to which subset of EOC programs should invest first—emergency obstetric care (EmOC) or basic essential obstetric care (BEOC):

- ***Emergency obstetric care (EmOC)*** responds to unexpected complications, such as hemorrhage and obstructed labor, with blood transfusion, anesthesia and surgery. Unlike EOC, it does not include management of problem pregnancies (e.g., pre-eclampsia), monitoring of labor, or neonatal special care. Midwives with life-saving skills and obstetricians are needed for EmOC.
- ***Basic essential obstetric care (BEOC)*** includes the EOC needed for detecting complications early, but it does not include surgery, anesthesia, and blood replacement. This subset of EOC could be called preventive maternity care.

Whereas most of EmOC must be provided in facilities with specialists, BEOC can be provided at a health center, birthing center, or basic hospital, through non-physician providers such as clinically trained midwives. This approach does not demand highly trained obstetric specialists or fully equipped operating theaters and, therefore, has the potential to bring services closer to women. However, if a life-threatening complication happens, EOC (or EmOC) facilities must be accessible to the BEOC services for timely referral.

**Table 1: Comparison of Essential Obstetric Care (EOC) with Basic (BEOC) and Emergency Obstetric Care (EmOC)**

<b>EOC (also Comprehensive EOC)</b>	<b>Comprehensive EOC</b>	<b>Basic EOC</b>	<b>EmOC</b>
Surgical obstetrics	<b>X</b>		<b>X</b>
Anesthesia	<b>X</b>		<b>X</b>
Blood replacement	<b>X</b>		<b>X</b>
Management of problem pregnancies	<b>X</b>	<b>X</b>	
Medical Treatment	<b>X</b>	<b>X</b>	<b>X</b>
Manual procedures	<b>X</b>	<b>X</b>	<b>X</b>
Monitoring of labor	<b>X</b>	<b>X</b>	
Neonatal special care	<b>X</b>	<b>X</b>	

**3. Are these “essential obstetric care” services the minimum that a health care system should provide for safe delivery and treatment of complications?**

*No, as important as the technical skills, is the non-technical dimension of care. EOC should be oriented towards clients and communities.*

The list of key interventions in table 1 contains only biomedical interventions. Yet, EOC is more than ensuring the quality of care of biomedical interventions. Ensuring maximum use and comprehensiveness of EOC services has a non-technical dimension that requires interventions aimed at:

- Establishing trust and confidence in services. This has been accomplished through an emphasis on interpersonal counseling and communication and an orientation of services to the cultural traditions of communities similar to that defined in Family-Centered Maternity Care (see box 1).
- Improving decision-making of women and families for skilled care for delivery and complications, care during pregnancy and the postpartum period, and essential newborn care; and
- Reducing the barriers to access (e.g. transport, cost) for families by addressing the deficiencies in the existing referral system and the financing of care.

**Box 1: Family-Centered Maternity Care**

*Family-Centered Maternity Care is designed to meet the informational, social, emotional and physical needs of pregnant women and their families during pregnancy, childbirth and postpartum. Emphasis is placed on education and preparation for childbirth so that the woman and her family can assume more active roles. FCMC invites the family’s supportive presence during labor and birth, and focuses on enhancing and supporting the normal birth, screening for deviations from normal birth, and intervening only when deviations occur. FCMC avoids the unnecessary use of invasive, uncomfortable or restrictive procedures.*

*--Judith Rooks, CNM, Dr.PH*

## Safe Motherhood: Who can provide essential obstetric services?

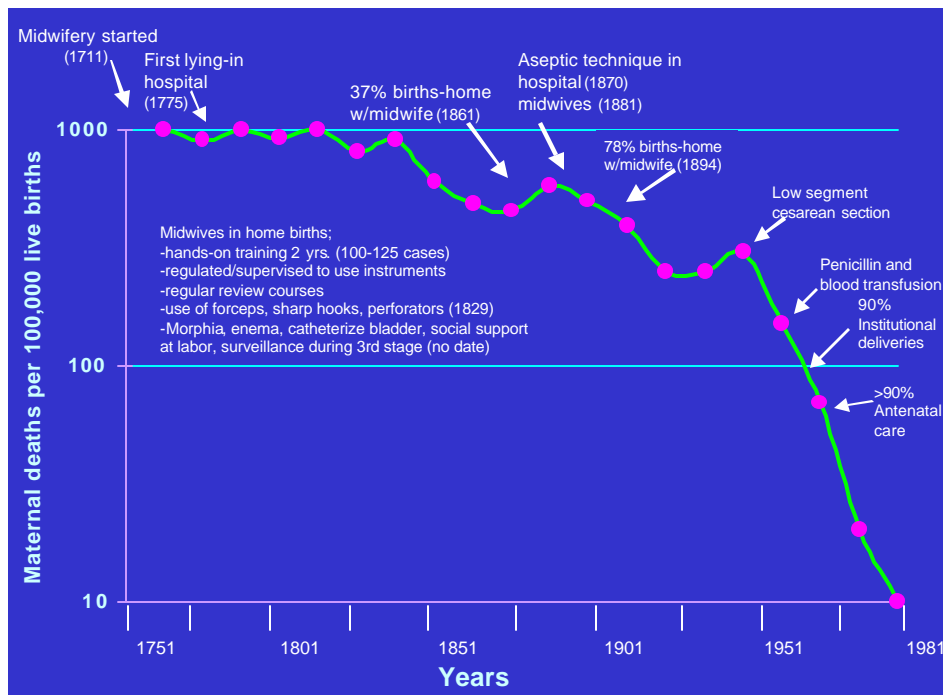
### 1. Skilled Birth Attendants (SBAs)

*Historical evidence demonstrates that skilled birth attendants can effectively reduce maternal mortality with Basic Essential Obstetric Care.*

A “skilled birth attendant” refers exclusively to clinicians with midwifery skills (e.g., doctors, midwives, and nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries, and diagnose and manage or refer complicated cases; they have the skills necessary to provide BEOC. In most cases, the front-line skilled birth attendants will not have surgical skills. Two case histories provide the evidence for the effectiveness of skilled birth attendants:

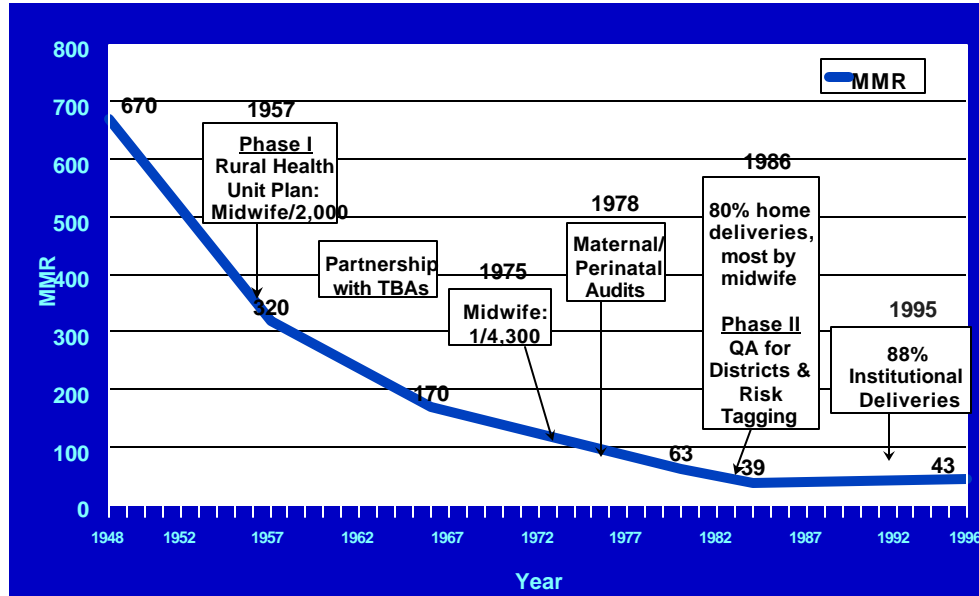
- Sweden’s maternal mortality declined from 567 to 227/100,000 live births over three decades in the late 19th century (1861 to 1894).<sup>1</sup> Two interventions are credited nearly equally with this decline (figure 4):
  - *midwifery-assisted home births, which increased from 30% to 70% over this period, and*
  - *the promotion of aseptic technique in both hospital and midwife-assisted home births. The percentage of women birthing in a hospital increased only slightly over this same period, from 1% to 3%.*

**Figure 4: Maternal deaths in Sweden, 1750-1980**



- In 1947, Malaysia recorded a MMR of 630. By 1970, the MMR had declined to 148, and by 1990 it had reached 43. A Government priority at Independence in 1957 was equity of care, meaning free and accessible health services. Midwives were placed at the village level to provide such care, including antenatal care, home-based delivery, and postpartum care. By partnering with the traditional birth attendants, midwives became the primary assistants for delivery, covering about 51% of deliveries in 1980 and 95% in 1996 (figure 5).<sup>2</sup>

**Figure 5: Maternal Mortality Ratio in Peninsular Malaysia, 1948-1995**



## 2. Traditional Birth Attendants (TBAs)

- ***There is no conclusive evidence that TBAs alone can reduce maternal or newborn mortality.*** Given the treatments needed to manage the complications that kill the woman, it is not anticipated that further training of TBAs will be any more successful in reducing maternal mortality. A possible exception, but not yet tried, is management of uterine atony leading to postpartum hemorrhage: TBAs could massage the uterus.

The effectiveness of TBAs alone in reducing newborn deaths is untested in any reliable way.<sup>3</sup> More studies are needed to address the effectiveness of TBAs in reducing immediate newborn deaths, specifically from asphyxia.

- ***Partnering TBAs with more skilled providers at the village level has led to success in reducing maternal and neonatal mortality.*** The specific tasks of managing labor and delivery,<sup>4</sup> or recognizing and treating neonatal infections,<sup>5</sup> is retained by the more skilled provider—the midwife for delivery or a village health worker for provision of antibiotics or immunizations. TBAs facilitate access to pregnant women for the skilled birth attendant or village health worker because they are the gatekeepers to the home of the mother and newborn, especially those living at the margins— in the more remote areas, with less education, or with very low incomes.

Partnering with TBAs requires continuous outreach by the health system to support a relationship with the TBAs, knowledge of their customs, and sensitivity and respect for their work. In Malaysia, this meant explicitly respecting and promoting the post partum visits and family assistance provided by TBAs, so that skilled village midwives were able to provide the actual labor and delivery assistance in place of the TBAs.<sup>4</sup>

- ***TBAs can recognize and refer women with complications.*** Following training on danger signs and where to refer, plus provision of continuous support from hospital staff in both Fortealeza, Northeast Brazil, and Southwest Guatemala, TBA referrals of women with complications increased.<sup>6</sup> When given continuous support by staff nurses at their village sites, training, and access to an ambulance, the TBAs in Brazil selectively referred women with prolonged labor, malpresentation and first births to a regional public hospital. Hospital staff verified that the TBAs referred women more appropriate for hospital care than self-referrals in 52% versus 18% of cases, respectively. TBAs referred women with complications more likely to lead to more severe problems than those with minor problems, such as nausea or dizziness, whom they did not refer.
- ***Whether TBAs change hygienic practices is hard to determine.*** Methodological difficulties presented by women's self-report or TBAs report of complications have made results of such studies equivocal. Women's self-reporting of complications has proved not valid biologically,<sup>7</sup> throwing into question survey results from Ghana reporting a reduction in women's report of maternal infection (and retained placenta) following TBA training.<sup>8</sup> Training itself may not significantly alter practices for a variety of reasons: the belief systems of causation are not changed, as was found with Bangladeshi TBAs,<sup>9</sup> training is not competency-based; and TBAs are not well-supervised following training.<sup>10</sup>
- ***Expanding TBA functions beyond the birthing role has met with success.*** TBAs have provided iron folate tablets for pregnant women with resultant declines in anemia status among women.<sup>11</sup> They have also improved the contraceptive prevalence rates through distribution of family planning methods and information.<sup>12</sup>

Partnering with TBAs to ensure a safe delivery with a skilled birth attendant and the life of the neonate with a village health worker, and augmenting their role with specific health commodities they can promote or sell, appear to build on the strengths of TBAs. Either partnerships or augmentation with health commodities strengthens the TBAs' role in the community and may facilitate the access of women to skilled providers. Yet the few success stories that exist are testament to the fact that training programs, planners, and health program managers have typically not been able to develop effective ways of utilizing TBA resources.

### **3. Is the skilled birth attendant sufficient to ensure reduction of maternal mortality?**

***No, approximately 1% to 3% of births may require surgical intervention, and others may require EOC beyond that which a skilled birth attendant can provide alone.***

- England and Wales in 1958, a time when interventions were used to avoid maternal deaths but not to over-intervene, achieved a MMR of 60/100,000 when the Cesarean section rate was 2%.<sup>13</sup>



- The Netherlands had a MMR of 20/100,000 live births with a Cesarean section rate not exceeding 2%.<sup>14</sup>
- Harare, Zimbabwe achieved a MMR of 71/100,000 with emergency Cesarean rates of 2.7%.<sup>15</sup>
- In six West African countries, between 3% and 9% of pregnant women needed essential obstetric care at a referral facilities because of the severity of their complications.<sup>16</sup>

## **Safe Motherhood: Improving the Quality of Care of Skilled Birth Attendants**

### **1. Do “skilled birth attendants” actually have the skills necessary to provide a safe birth, and to recognize, manage or refer complicated clients?**

*A credentialed provider does not necessarily equate with a skilled provider.*

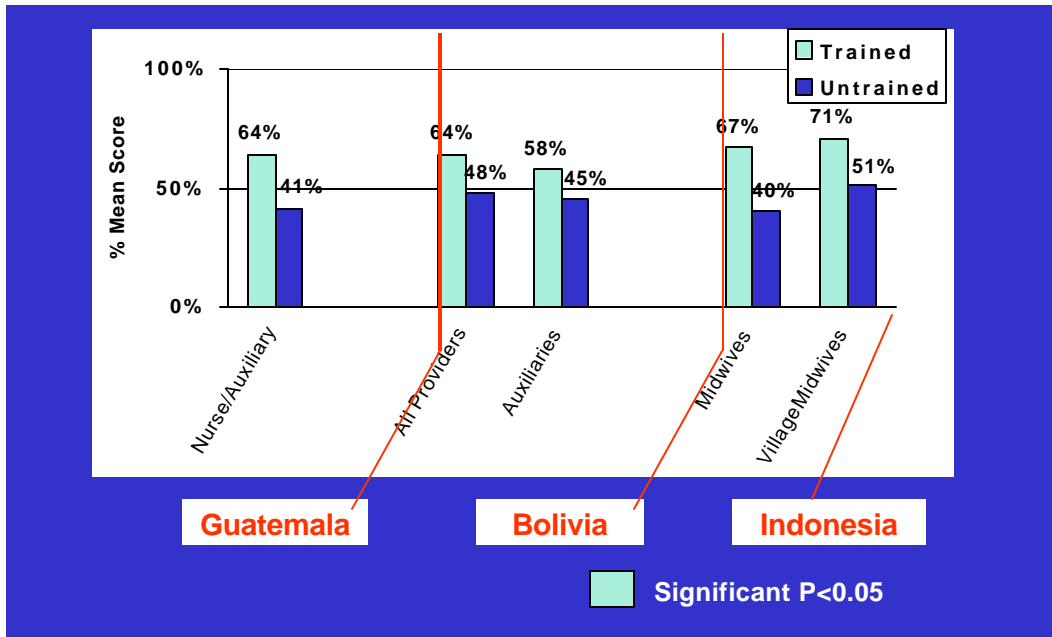
- In Guatemala, doctors, nurses and nurse auxiliaries had a mean percentage score of 41% when observed for the skills needed to accurately fill in and use a partograph, deliver a breech, resuscitate a newborn, and control postpartum hemorrhage.<sup>1</sup>
- In Bolivia, the mean percentage score was 48% for doctors, nurses and nurse auxiliaries for skills needed to perform a prenatal visit, a safe delivery (including use of the partograph), newborn resuscitation and management of postpartum hemorrhage.<sup>2</sup>
- For the facility-based and village-based midwives in Indonesia, mean percentage scores for skills for infection prevention, use of the partograph, manual removal of the placenta, bimanual compression for the management of postpartum hemorrhage, and neonatal resuscitation were 40% and 51%, respectively, although the latter (village-based midwives) had graduated from pre-service training in the previous three years.<sup>3</sup>

### **2. Can provider life-saving skills be significantly improved by short in-service training?**

*Yes, short in-service training can improve select life-saving skills of providers* (figure 6).

- Following in-service training in Guatemala, nurses, nurse-auxillaries, and doctors significantly improved their skills in the use of the partograph, management of postpartum hemorrhage and newborn resuscitation (although the improvement in newborn resuscitation was only borderline statistically significant).<sup>1</sup>
- In Bolivia, doctors, nurses, and nurses auxiliaries were trained in a team approach with a different curriculum than Guatemala based upon skills identified in the needs assessment. Trained providers greatly increased attention to warming and stimulating the newborn, but needed prompting on how to calculate the Apgar score. Improvements in management of postpartum hemorrhage were statistically significant. Despite training, few providers were able to initiate or complete the partograph.<sup>2</sup>
- Midwives who were trained in Indonesia demonstrated a statistically significant higher level of skills when compared with midwives not given life-saving skills training in skills for newborn resuscitation, use of the partograph and management of postpartum hemorrhage.<sup>3</sup>

**Figure 6: Skills assessment for birth attendants, Guatemala, Bolivia, and Indonesia, 1999**



**3. Is in-service training enough to improve life-saving skills to a level of minimum competency?**

*No, the in-service training does not improve all skills to a level of competency considered adequate.*

In Indonesia, a level of 70% was chosen as a threshold for competence.<sup>3</sup> Among the trained village-based midwives, 67% had average scores greater than or equal to 70% for the five skills, while only 6% of those who had not gone through the in-service training were able to achieve competence. Village-based midwives had received pre-service training within 3 to 5 years prior to the in-service training.

Facility-based midwives and clinical instructors, who often had not had refresher training for over 10-15 years, did not fare as well as the village midwives. Only 46% of trained midwives and 48% of clinical instructors scored at least 70% in performing all of five key skills. This gap would be even wider if a higher threshold of competence were chosen.

While there are many reasons for the inadequate skill level, it raises concern about the overall knowledge and skill levels prior to in-service training, as well as the adequacy of short-term training and follow-up clinical supervision to bring the level of skill of these service providers to acceptable levels. Both pre-service and in-service training are necessary to raise the level of skill providers to adequate levels (box 2).<sup>4</sup>

### **Box 2: Improving Training—Principles of Effectiveness**

- Complete an assessment before design of a training program.
- Build training on evidence-based, nationally approved standards.
- Recruit influential champions as role models.
- Implement a team approach to training.
- Carry out training at participants' site (if caseload permits).
- Prepare the training site before training starts.
- Ensure competency-based training with sufficient caseload.
- Build training in treatment of complications on sound knowledge of “normal” birth.
- Design training to focus not only on clinical skills, but also problem-solving skills and skills which promote responsiveness to clients.
- Combine a continuous system of in-service training with pre-service training.

#### **4. Is it necessary to improve the non-technical dimension of the quality of care?**

*Yes, attention to interpersonal skills and relationships between providers and clients is as much in need of improvement as technical skills.*

The attitude of providers and the atmosphere within facilities can be a major barrier to the use of services. Quality of care can be improved in order to make the services more acceptable to clients by:

- interventions to improve interpersonal skills of providers,
- accommodation of neutral and beneficial cultural beliefs of communities in service delivery, and
- participatory methodologies that define and evaluate the quality of care from the community perspective.

*Clearly, the interpersonal process is the vehicle by which technical care is implemented and on which its success depends.*

*Avedis Donabedian, 1988<sup>5</sup>*

#### **5. Is it possible to improve the interpersonal counseling and communication skills of providers and to sensitize them to certain cultural practices?**

*Yes, short training can improve counseling and communication skills.*

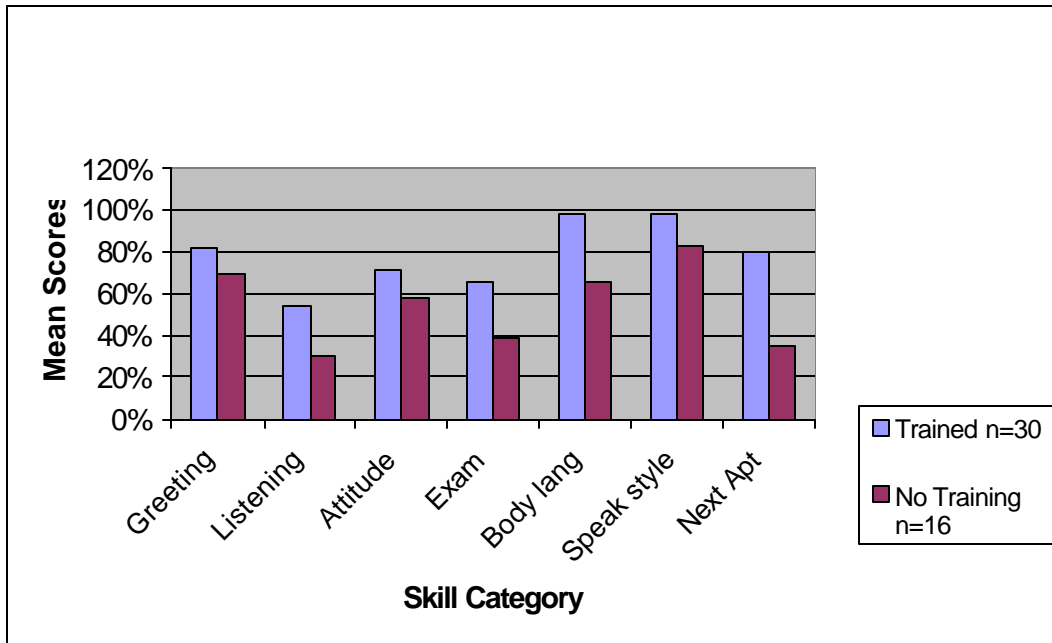
In Indonesia, village midwives were perceived to be insensitive by the community. They received a 3-day training to enhance their interactions with their clients in the topics in table 2.<sup>6</sup> Post-training, the mean IPCC scores of trained village midwives (78%) were significantly higher than untrained midwives (54%) (figure 7). However, the mean scores declined over a period of time. Mean scores for IPCC trained midwives decreased from 78% at three months after training to 64% at 15 months after training. The specific IPCC skills that declined and required reinforcement were those skills that were new: active listening, providing information about

physical exams, and scheduling follow-up/next appointments. A source of reinforcement for the IPCC skills of village midwives was the Life Saving Skills training they received after the IPCC training.

**Table 2: Interpersonal communication and counseling (IPCC) skills, Indonesia 1997**

Skill	Description of skills
Greeting	How the village midwife welcomes her client
Active listening	Clarification (asking the client to explain the problem), paraphrasing (rewording questions from patients), reflection (using the women's own words, and summarizing the discussion)
Attitude	Includes patience, avoiding the use of a rude voice or criticism, maintaining eye contact
Physical exam	Explaining steps and results of physical exam
Body language	Non-verbal communication
Conversation style	Ability to use appropriate language
Next appointment	Explicit communication with woman to set up appointment

**Figure 7: Evaluation of IPCC Skills of Midwives in Indonesia, 1999**



\* All differences are statistically significant ( $p < 0.05$ )

## 6. Are maternal or perinatal death audits effective in improving provider performance?

*While maternal death audits are routine procedure in developed countries, they are only now being studied to see if they improve quality of care, including provider performance, in developing countries. They are not a substitute for skills training, rather a method of diagnosing problems.*

Typically, a maternal or perinatal death audit is a review of events leading up to a death in a facility. The results of studies of the effectiveness of audits, as well as other feedback mechanisms to providers, is mixed in terms of improving provider performance in developed countries.<sup>7</sup>

Recent promising efforts in maternal health have broadened the types of audits undertaken:

- Criterion-based audits are being piloted in Jamaica and Ghana that focus on the management of five life-threatening obstetric complications. Criteria for best practices in management of obstetric complications are defined, current practice observed and findings relayed to staff. Targets are then set for changes --and following implementation of the changes-- the cycle of evaluation of practice and feedback repeats. Initial results are promising:
  - *targets have been set for changes (e.g., obstetric hemorrhage: clinical monitoring for pulse and blood pressure to detect early deterioration should be done at least quarter hourly for 2 hours. The current practice is 23% and the target 100%.);*
  - *clinical protocols are available;*
  - *training workshops on the protocols have been implemented;*
  - *roles and responsibilities were reviewed;*
  - *storage of records improved; and*
  - *case review meetings held with review of audit criteria.*<sup>8</sup>

While such an audit is useful in diagnosing the need and monitoring change, a similar audit undertaken in the United Kingdom showed only modest changes in provider performance.<sup>9</sup>

- “Near miss” audits are being studied in South Africa in a multi-center trial.<sup>10</sup> “Near miss” refers to a severe acute maternal morbidity that the woman survives. Hence she can be interviewed for a clear description of the events of her disability, including those at the family and provider levels. In a pilot study, using this definition of near miss, approximately five times as many cases of severe acute maternal morbidity as mortality were identified. These study results hastened the process of identifying the disease pattern in the area, the problems needing attention (especially for preventive programming), and the skills and resources required to manage the cases.
- A district level audit of maternal and perinatal deaths, introduced in 1994 in South Kalimantan, Indonesia, captures the events preceding a death at all levels of the system, including medical and non-medical barriers at the home, community and facility levels.<sup>11</sup> Each death is investigated by the village midwife from the area of residence of the case. The district Maternal and Perinatal Audit (MPA) Team, consisting of district level health administrators and hospital physicians, coordinates the review, bringing together community and facility level people involved in the case. Because most deaths occur in the home in

South Kalimantan, the MPA fosters closer working relationships between levels of health providers by bringing facility and community-based providers together. The MPA also aims to improve communications between the district health office, district hospital and community level staff in health centers, posts and in the villages, to increase appropriate referral for complicated cases. Recommendations from the MPA meetings have resulted in identifying specific training needs for the midwives, and recognizing the need for a blood bank, specific drugs, and for standard treatment guidelines.

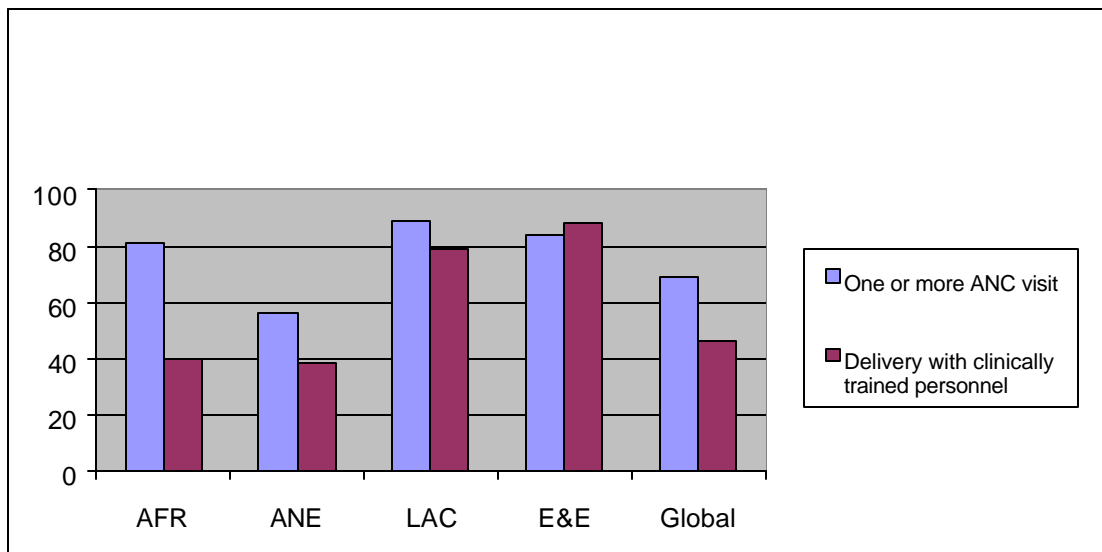
## Safe Motherhood: Use of Skilled Care -- Levels and Determinants

### 1. What is the level of use of maternal health services?

*Use of antenatal care has slowly increased over the past decade. Use of a skilled birth attendant (SBA) has also increased, except in Africa where levels have plateaued. Use of a skilled birth attendant typically lags behind use of antenatal care.*

- Use of any antenatal care with a clinically trained provider increased by about 5% between 1990 and 1999 among women in developing countries, reaching a level of approximately 69%.<sup>1</sup> While increase was seen in every region of the developing countries, approximately 31% of women in the developing world receive no antenatal care during pregnancy, the biggest proportion being in Asia and the Near East (44%) (figure 8).<sup>1</sup>
- Use of skilled care during labor and delivery has increased by nearly 7% in all regions of developing countries over the decade, with the exception of the African region. However, approximately 56% of women in the developing world give birth without a skilled attendant. Again the largest proportion of women not using such services is in Asia and the Near East at 61% (figure 10)<sup>1</sup>

**Figure 8: Coverage of Maternity Care: Global Profile, 1999**



AFR: Africa; ANE: Asia & the Near East; LAC: Latin America & the Caribbean; E&E: Eastern Europe and Eurasia.

### 2. What are the broad determinants of care seeking?

- *Both availability and acceptability of services are important dimensions that facilitate the use of skilled care for deliveries. However, many women continue to deliver at*



*home with a TBA or relatives due to the “woman-centered care” that is provided in the home environment.*

MotherCare’s community assessments in several countries reveal that in each country, there are women who prefer home deliveries with TBAs and there are others who seek out professional providers and institutional settings (box 3).<sup>2</sup>

**Box 3: Reasons for Home or Institutional Deliveries, MotherCare Community Assessments in 6 Countries, 1995-1998**

***Home Delivery with a TBA***

- Tradition/custom
- TBA’s interpersonal skills, special care, and respect for local customs (e.g. returning placenta, allowing woman to remain partially clothed, choice of birthing position)
- Cost of skilled care is prohibitive

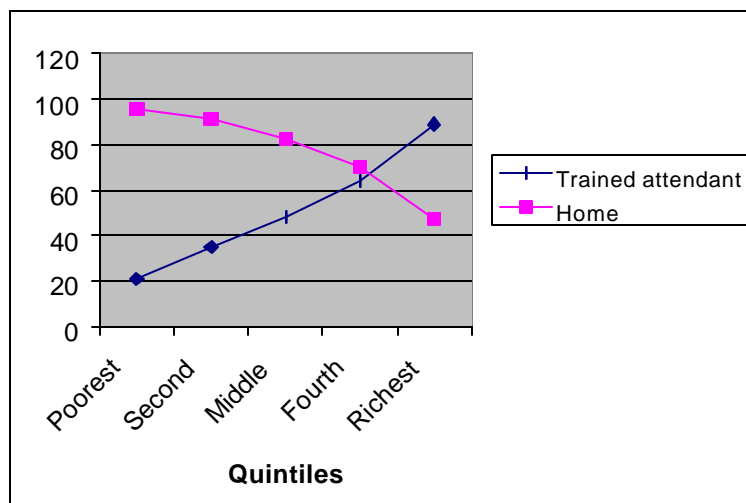
***Institutional Delivery***

- Skills of clinically trained provider
- Safety/capacity to manage complication
- Negative perception the skills of TBAs and their capacity to manage complications

- *The larger socio-economic context, which influences and interacts with barriers to use of skilled care at the family and community levels, should not be forgotten.*

Poor and marginalized women are most at risk of maternal mortality due to their lack of access to skilled care, making this increased risk both a public health issue as well as one of social justice (figure 9).<sup>3</sup>

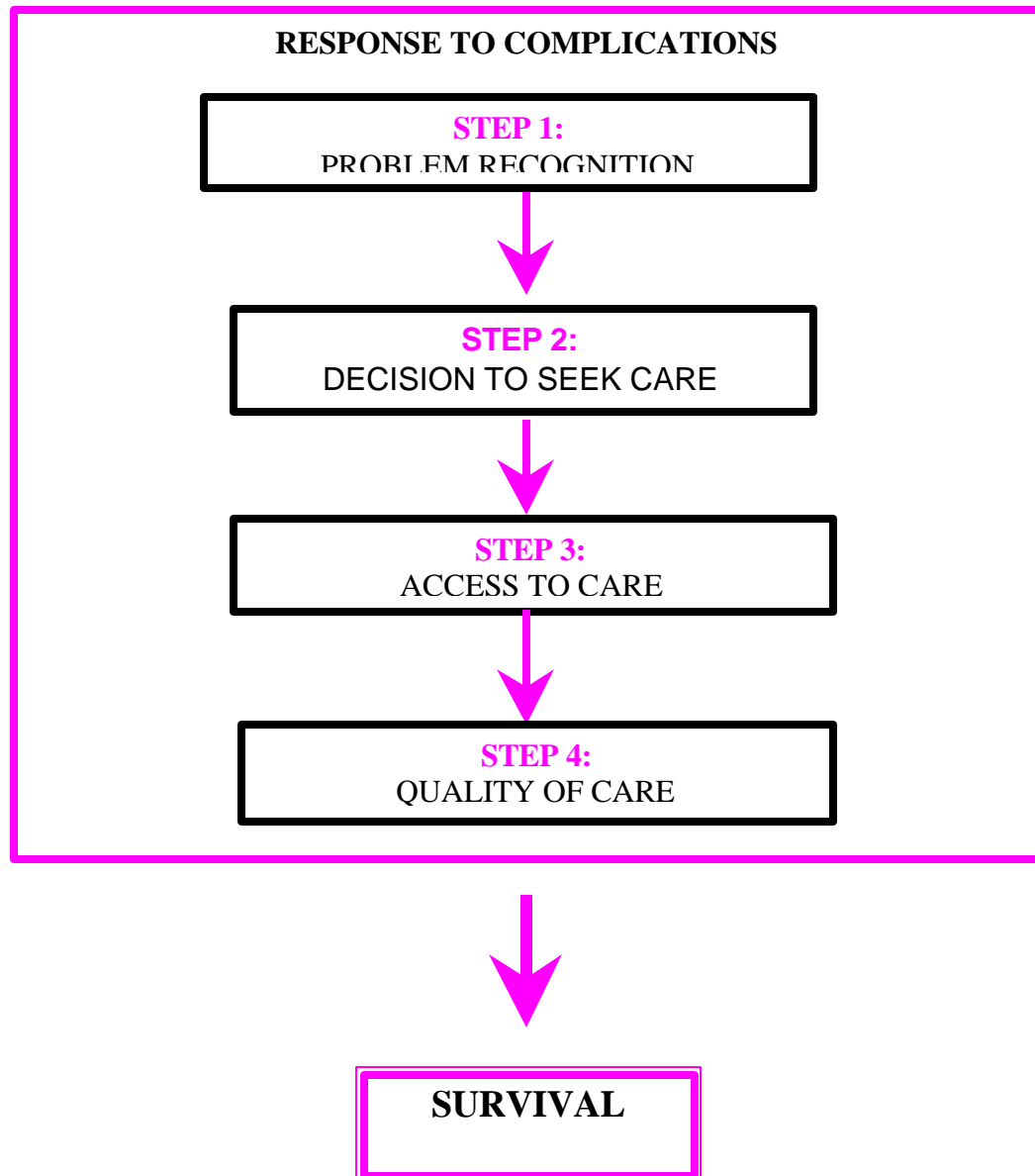
**Figure 9: Influence of Poverty on Use of Skilled Care for Delivery, Indonesia, 1997**



**3. What factors influence the decision-making of families and communities regarding use of skilled care?**

The Pathway to Survival assists in understanding the factors that influence decision-making for use of skilled care (Figure 10).<sup>2</sup>

**Figure 10: Safe Motherhood Framework: Pathway to Survival**



## STEP 1: PROBLEM RECOGNITION

Recognition involves more than awareness of the danger signs of major obstetric complications. It also requires an accurate perception of severity of the complication as well as knowledge of the appropriate life-saving action necessary to address the complication (box 4).<sup>2</sup>

### Box 4: Reasons for Low Recognition of Danger Signs

- Pregnancy is considered a normal event in most countries.
- Some obstetric complications lack distinguishing characteristics along a continuum between normalcy and emergency that triggers alarm.
- Beliefs associated with major obstetric complications in different settings affect the interpretation of their severity and the decision to respond appropriately.
  - *In Indonesia and Guatemala, notions regarding the positive cleansing effect of bleeding prevents families and attendants from accurately assessing postpartum bleeding.*
  - *Even though awareness of the severity of sobreparto (local term for condition similar to puerperal sepsis) is high in Bolivia, the cultural interpretation of its etiology makes women and families turn to the traditional rather than the medical system for treatment.*
  - *In Egypt, Indonesia, and Pakistan, eclamptic convulsions may be associated with supernatural causes (e.g., possession by spirits) requiring exorcism by faith healers rather than medical*

Knowledge of the danger signs of most major complications is generally low: Less than 30% of women interviewed in Bolivia, Indonesia, and Pakistan spontaneously mentioned hemorrhage during pregnancy, delivery, and the postpartum period as a complication. In addition, in the same three countries less than 5% of women spontaneously mentioned convulsions as a complication (table 3).

**Table 3: Percent of Women Aware of Danger Signs of Major Obstetric Complications, Baseline Surveys, Bolivia, Indonesia, Pakistan, and Nigeria, 1995-64,5,6,7**

	Bolivia (N=1332)	Indonesia (N=1173)	Pakistan (N=396)	Nigeria (N=1849)
Hemorrhage	26-28	8-26	6-8	46
Eclampsia (convulsions)	2-7	2-3	3-4	----
Prolonged Labor/ Obstructed Labor	38-44	6-17	3-10	23
Puerperal Sepsis	69	19	5-7	21

Ranges result due to: (1) questioning regarding hemorrhage and eclampsia during different stages in pregnancy, and (2) combination of multiple, yet distinct, questions regarding danger signs for prolonged/obstructed labor and puerperal sepsis (Pakistan only).

- In *Mexico*, verbal autopsies of 145 maternal deaths revealed that the obstetric complication remained unrecognized in 16 percent of the cases. In addition, the severity of the complication was recognized during the initial 24 hours after the complication arose in only 56% of the cases.<sup>8</sup>
- In *Nepal*, the complication remained unrecognized in half of the 132 maternal deaths; traditional healers continued to be consulted for obstetric emergencies, possibly due to a lack of knowledge of the severity of the obstetric complication.<sup>9</sup>

## **STEP 2: DECISION-MAKING**

*Influential family members who take part in decision-making for preventive and emergency situations and influence the use of skilled care, may include: husband or partner, mother-in-law, mother, other important family and community members (e.g. TBA, traditional healers), and primary level providers.*

*Women's low status, resulting in limited decision-making authority, limited physical mobility, and lower education, has been documented as an important underlying factor that contributes to decision-making to use skilled providers for complications.*

- In *Pakistan*, the husband's refusal for referral or his absence and family hesitancy contributed to the deaths of 29% of the 150 pregnant or recently delivered women brought dead to the public tertiary care facility.<sup>10</sup>
- In *Mexico*, a comparison between women who died in the hospital and those who survived similar obstetric problems yielded only one socio-economic variable that was statistically significant: the number of years of schooling of the woman and her partner. A higher level of schooling may have helped women to take the decision to go on to another health center or encouraged a different attitude amongst health providers, who more often referred women with more education on to facilities where they received the care they needed.<sup>8</sup>

## **STEP 3: ACCESS TO CARE**

*The decision to seek skilled care often depends upon overcoming the access barriers. These may include distance to reach skilled care, availability and cost of transportation, hours of facility operation, cost of services, and the lack of community support systems.*

- In rural *Zimbabwe*, relatives of women who had died most often mentioned the lack of transport and money as reasons for their death. More specifically, the absence of an emergency transport at the community level contributed to approximately 50 percent of the maternal deaths from hemorrhage. Economic and childcare responsibilities also posed difficulties to women leaving the home.<sup>11</sup>
- In *Pakistan*, access issues such as the lack of transport and finances, contributed to the deaths of 36% of the 150 women brought dead to a public tertiary care facility.<sup>10</sup>

#### **STEP 4: QUALITY OF CARE**

*The technical as well as non-technical dimensions of the quality of care offered are important to decision-making regarding use of skilled care. Community perceptions of the quality of care in most countries reveal that both the perceived efficacy and the client/cultural orientation of services are important in stimulating the use of skilled care. (box 5).<sup>12</sup>*

##### **Box 5: Client Perspectives Regarding Quality of Care**

- General mistreatment (e.g. rudeness, neglect)
- Discrimination (e.g., social class, ethnicity, indigenous groups) and lack of respect for traditional beliefs
- Language barrier
- Lack of privacy
- Shame (e.g., vaginal examination)/gender of provider
- Rumors and fears of procedures (e.g., episiotomy, cesarean section, sterilization) and death
- Skills, experience, age, and gender of provider
- Institutional capacity to respond to emergencies (e.g., personnel, equipment, drugs)
- Other institutional factors (e.g., long waiting periods, absenteeism, rejections)

## **Safe Motherhood: Facilitating Access to a Skilled Birth Attendant: Roles of Women, Families, Communities and Health Services**

### **1. What strategies have been used to facilitate access to a skilled birth attendant?**

The health service systems in a variety of settings have reached out to communities to facilitate access to skilled care for deliveries by:

- *Culturally Adapting Delivery Care, Bolivia*

Certain cultural practices catering to the needs of women during delivery were negotiated and incorporated into service delivery. These included:

- allowing the presence of husbands or TBAs in the delivery room;
- keeping the woman warm during and after birth;
- allowing the woman to choose her birthing position, and returning the placenta to the woman if desired.

- *TBA Friendly Health Facilities, Guatemala*

In Guatemala, the health system reached out to TBAs, overcoming ethnic and class barriers. Outreach activities such as meetings of TBAs and referral facility providers and guided tours of the referral facility enabled the TBAs to develop a confidence and trust in the health system.

- *Enhancing the acceptability and roles of village midwives in decision-making with women, families, and traditional birth attendants, Indonesia*

Once trained village midwives were available to communities, the challenge was to increase their acceptability of this new cadre of skilled providers among women, families, and traditional attendants. Ceremonies in each village, led by the village leader and his wife, were used to pave the way for the re-introduction and increased acceptance of the village midwives after completion of their training, since they were perceived to be inexperienced and insensitive. This new cadre of skilled providers determined ways to partner with the TBAs who provided most of the birth assistance in these communities. They also proved instrumental in counseling both women (during prenatal and postpartum visits) and traditional birth attendants about maternal complications and the need to plan for emergencies at the family level after they had been sensitized to the local culture of birthing. Print materials and radio spots were also utilized to reach women and their husbands with key messages regarding the necessity for skilled care.

- The percentage of women who utilized village midwives and/or health care providers for information about safe motherhood and as a delivery attendant significantly increased during the time of the MotherCare program in South Kalimantan (see figure 15).
- When women were asked where or from whom they had received information about health and health problems during pregnancy and delivery, the percentage of women who mentioned a village midwife rose significantly from 12% in 1996 to 40% in 1999. The percentage of women who found “health service personnel” a convincing source of information significantly increased from 73% in 1996 to 87% in 1999.<sup>1</sup>

**2. Is it beneficial to involve clients and communities in ensuring that services are oriented to their needs?**

*Yes, client involvement, expectations, and demands can exert an influence on the behavior of providers:*

- In Bolivia, training of providers in interpersonal counseling was accompanied by messages to providers and communities focusing on the rights of clients to quality care.<sup>2</sup>
- In Nepal, exposure of both providers and clients to a radio intervention resulted in a higher mean score for IPCC behaviors than the mean score obtained with exposure of one group only.<sup>3</sup>
- A community mobilization strategy in Peru enabled community members and providers to develop participatory videos in an effort to reach a consensus on the definition of “quality” and to generate action plans to improve the quality of care. The alliance between providers and communities resulted in an improved communication between providers and clients and also increased utilization of public health services by indigenous community members in project areas.<sup>4</sup>
- Joint committees of community representatives and providers in both Peru and Bangladesh have proved to be a viable and effective mechanism to coordinate activities and monitor the quality of care in a more equitable manner.<sup>4,5</sup>

**3. Can delegation of responsibility succeed in increasing service availability safely?**

*Yes, delegation of responsibility to providers to give safe quality care beyond the traditional scope of their specialty has succeeded through policy plus competency-based training.*

- In Ghana midwives were successfully trained to expand their scope of practice to treatment of complications of unsafe abortions. This increased the availability of services beyond the services available with doctors in urban hospitals, into communities with maternity homes. No procedure-related complications were reported among women managed by midwives up to two years post training.<sup>6</sup>
- In Mozambique, assistant medical officers trained in surgery in a three-year course were able to provide Cesarean sections as safely as specialists; complication rates and mortality for the surgical patients of medical assistants were extremely low.<sup>7</sup>

**4. Have maternity waiting homes been successful in bringing more women into skilled delivery care?**

*Yes, maternity waiting homes have proved successful in increasing use of skilled delivery care with better outcomes.*

Maternity waiting homes are typically built near hospitals and provide a place where women can go near the time of delivery to have easy access for a hospital delivery. In order to work well, there must already be demand for hospital delivery.

- In Cuba, a network of hospital services for the entire population was established in order to increase the numbers of deliveries by trained providers starting in the early 1960s. Special attention was paid to the rural areas where access and communications were extremely difficult. Existing hospitals were also enlarged and new ones built in rural areas. Maternity waiting homes were set up in the vicinity of the hospitals so that women from remote areas could be accommodated during their last weeks of pregnancy. The first maternity waiting homes were opened in 1962; by 1984, there were 85 homes with 1461 beds. As a result of these homes, according to the author, the proportion of institutional deliveries increased from 63% in 1963 to 99% in 1984. Maternal mortality fell from 118 to 31/100,000 during this time period.<sup>8</sup>
- "A maternity waiting home close to a rural hospital is vital where women have to travel long distances, transport is poor, and obstetric disasters are frequent," according to a study on the impact of maternity waiting homes in Central Ethiopia.<sup>9</sup> The first maternity waiting home was opened in 1976 to service the catchment population of the Attat Hospital, forming part of the maternity services in the rural areas. The homes were intended for pregnant women "at risk" with the majority having multiple risk factors. Their impact was evident from the following:
  - the absence of ruptured uteri and deaths among the women using the home;
  - the increase in deliveries in Attat Hospital from 615 in 1985 to 777 in 1987, although the proportion of complicated deliveries remained at 53%;
  - the 13 maternal deaths among women directly admitted to hospital versus none among the women using the maternity waiting homes; and
  - a stillbirth rate ten times higher among the direct hospital admissions than among the women admitted from the maternity waiting homes.
- While maternity waiting homes are promoted to reduce death from intra- and post-partum maternal complications of "high risk" pregnancies, they also have the potential to reduce adverse perinatal outcomes, as reported in a maternity waiting home study in Zimbabwe. By comparing intra-hospital perinatal deaths among women who stayed in the maternity waiting home with those who came directly from home to the hospital during labor, the perinatal mortality rate was reported as 19/1000 live births versus 32/1000 respectively, an almost 50% reduction.<sup>10</sup>

## **5. Are birthing homes a useful option in increasing use of a skilled birth attendant?**

***Birthing homes have the potential to increase use of a skilled birth attendant, but evidence is lacking to date.***

Birthing homes are different from maternity waiting homes in that they are typically a place in the community where women can go to give birth with a skilled provider. Often built by community members, such homes draw skilled providers to the communities. They have been used in Honduras,<sup>11</sup> Cuba,<sup>8</sup> and are presently being tried in Guatemala.<sup>12</sup> The village-based midwives in Indonesia also may have a delivery bed at their office in the village. The potential of birthing homes is great in not only increasing use of a skilled birth attendant but also acquainting the clinically skilled providers with the more cultural aspects of birthing and partnering with community health workers, such as the TBAs.



## **Safe Motherhood: Increasing “Met Need”<sup>\*</sup> for Complications**

### **1. Can family decision-making be improved to prevent mortality?**

*Family decision-making to prevent maternal and perinatal mortality involves prompt recognition of danger signs and appropriate care-seeking. Community-oriented approaches (e.g. communications, community mobilization) have been successful in enhancing decision-making at the family/community levels by improving knowledge of danger signs and emergency preparation to overcome care-seeking barriers.*

- ***Improving Awareness of Danger Signs***

- ***Increasing the capability of Mayan women and families to act appropriately in emergencies through a participatory group methodology and radio messages, Guatemala.***

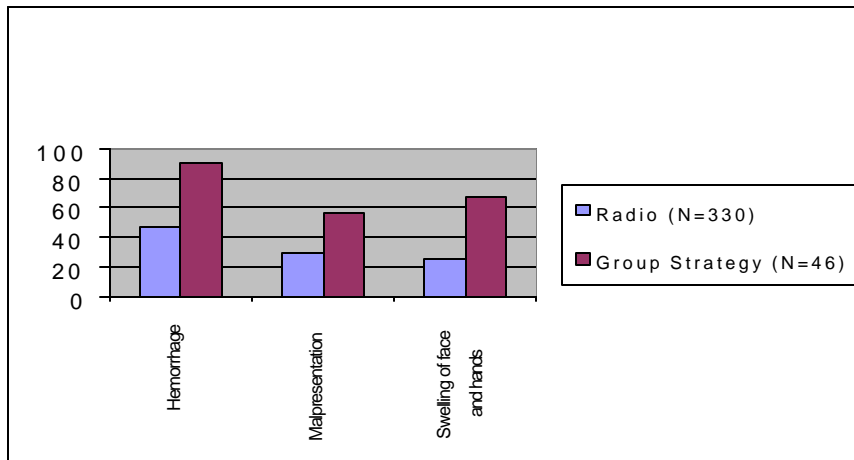
Indigenous Mayan populations were reached with radio messages and approximately 62 existing groups of 2,200 Mayan women were mobilized through a participatory group strategy that raised their consciousness about maternal and newborn deaths and strengthened their organization for decision-making and actions for ensuring maternal health and survival.

- ♦ The strongest predictor for increased awareness of danger signs among women was the participatory women’s group strategy. The evaluation of the women’s group strategy demonstrated gains in knowledge regarding danger signs of all major obstetric complications (figure 11).<sup>1</sup>
- ♦ Almost all women in the women’s groups who were interviewed mentioned that women should be taken to a hospital for complications. Actions were taken by almost all of the women’s groups after a discussion of the problems relevant to their areas. Examples of these actions included: referral to health services for complications, advising other women, talking to husbands, and developing linkages with community clinics.<sup>1</sup>

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<sup>\*</sup> Met need is defined as the proportion of women estimated to have major obstetric complications who are managed at facilities with comprehensive EOC during a defined time period. The numerator is based on the number of women with major complications who present at hospitals (or who develop them while in hospital) and the denominator is an estimate of how many women at the population level are expected to have a major complication (15% of live births).

**Figure 11: Impact on Levels of Awareness of Select Danger Signs by Strategy in Guatemala, 1999**



➤ ***Reaching Quechua and Aymara women and families and their providers with a radio soap opera, print materials, and community role-plays, Bolivia.***

A sixty-chapter radio soap opera, portraying the co-existence of the Andean and occidental worlds, was chosen to reach indigenous pregnant women, women of reproductive age, their husbands and partners, and families in the distant rural areas in Bolivia. Community educational efforts supplemented the radio strategy in select areas with particularly high mortality and involved the communities and health care providers in role-plays that stimulated planning for maternal and newborn emergencies. In addition, print materials for communities and providers focusing on pertinent messages for maternal health and survival also highlighted the rights of pregnant women to quality health services.

- ♦ More women who heard the radio soap opera were able to spontaneously mention the danger signs of the major obstetric complications, particularly the danger signs for ante- and post-partum hemorrhage. Even so, the levels of knowledge of danger signs of complications other than *sobrepardo*, a locally well-known complication similar to puerperal sepsis, remained unacceptably low.
- ♦ Those individuals who had participated in the community educational strategy were more aware of the danger signs of major obstetric complications, their severity, and a greater number expressed an intention to use formal health services to resolve these complications than those who had not participated in the community educational strategy (table 4).<sup>2</sup>

**Table 4: Improvement in Decision-making of Individuals with Community Education, Bolivia, 1998-99**

	No Community Educational Strategy August, 1998 (N=120)	Community Educational Strategy August, 1999 (N=44)
Awareness of Danger Signs	14-41%	34-73%
Perception of Severity	44-75%	77-96%
Intention to Use Health Services	62-82%	89-98%

\* Ranges result due to questioning regarding major obstetric complications separately for each of the three categories presented.

\*\* Differences between those who participated in the community educational intervention and those who did not, were all statistically significant.

- ***Ensuring Access to Resources***

***Strategies to enhance decision-making of families and communities during obstetric emergencies must also address access constraints in the community either directly (provision of transport, finance schemes) or indirectly (contingency planning, linking families to existing resources within their community).***

- ***Transport, Communication, and Funding Schemes***

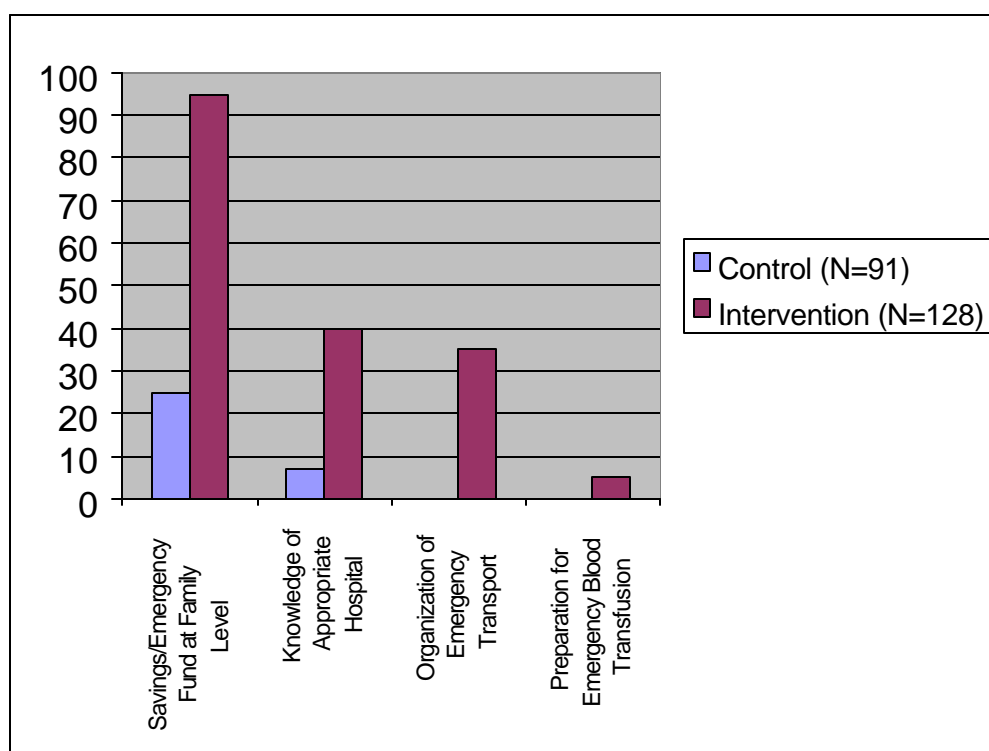
In Sierra Leone, an emergency vehicle was placed in the hospital and a system of communication (first with motorbikes, then radios) in eight primary health units. This resulted in an increase in the number of women with serious obstetric complications arriving for care from 0.9 to 2.6 per month and a decrease in case fatality from 20 to 10 percent. In Nigeria, the community was mobilized around issues of transport and funds for fuel and demonstrated that a delay in seeking care for obstetric emergencies due to lack of transport had been reduced by approximately 7 percent.<sup>3</sup>

- ***Counseling Pregnant Women Regarding Birth Planning***

Birth planning by families is being promoted in Bangladesh through interpersonal communication (health workers counseling pregnant women three times using a birth planning card) and a pictorial birth planning card that includes messages about knowing appropriate facilities, making arrangements for transport, and planning costs and other necessary resources (e.g. blood transfusion). Health workers counsel women and influential family members three times during the pregnancy (figure 12).<sup>4</sup>

- ♦ A small survey to evaluate the birth planning strategy demonstrated that saving money for an obstetric emergency by the families is the most common practice, followed by making arrangements for transport.
- ♦ The identification and knowledge of an appropriate referral hospital also increased. However, few families make arrangements for a potential blood transfusion by identifying compatible donors.<sup>4</sup>

**Figure 12: Impact of Birth Planning Strategy on Decision-Making of Women and Families for Potential Emergencies, Bangladesh, 2000**



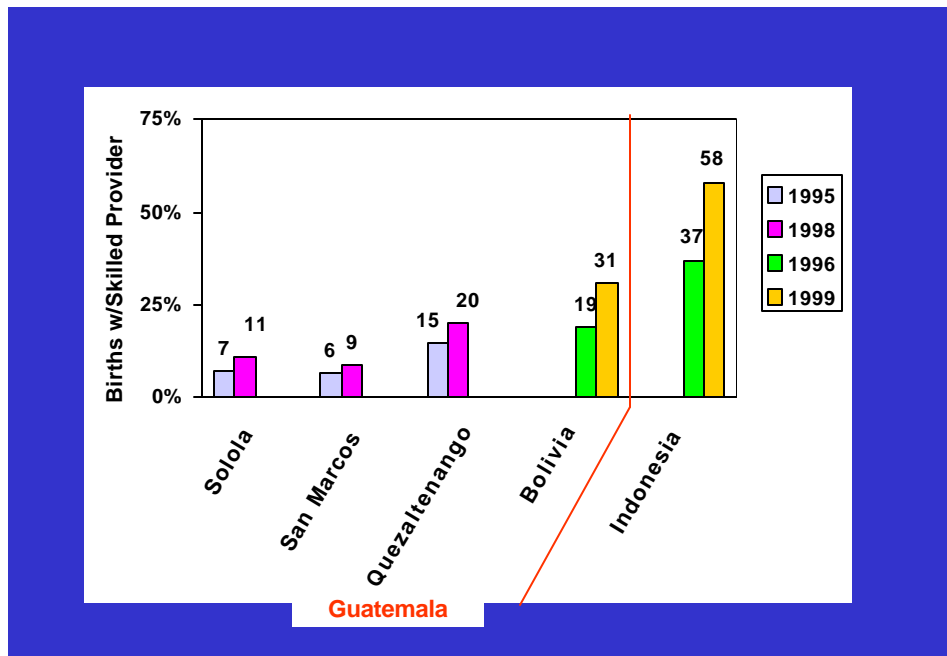
**2. How effective are integrated maternal health strategies in stimulating use of skilled care and met need?**

*Integrated strategies have improved both the use of skilled birth attendants and the met need. The exception is in Indonesia where use of a skilled birth attendant increased significantly although met need remained the same. Integrated strategies include interventions that promote behavior change (specifically knowledge of danger signs and where to go for skilled obstetric care) and improve the quality of care of front-line providers and their referral system to manage safe births and complicated cases.*

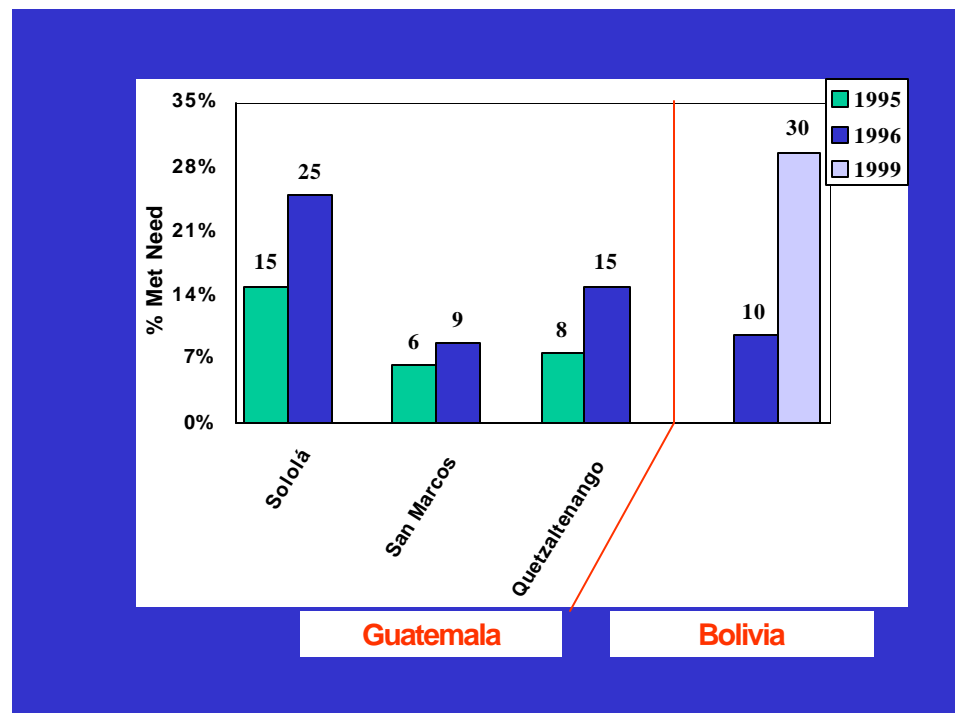
- In Guatemala and Bolivia, more women went to a hospital for labor and delivery care and, in Indonesia, more women used a skilled birth attendant at home (figure 13).<sup>5,6,7</sup>
- The patient profile changed in the health facilities, with women with complications making up a larger proportion of the clients in both Bolivia and Guatemala following the interventions. As no other interventions were occurring in Guatemala, it is likely that the MotherCare interventions played a role in this increase in women with complications seeking care. In Bolivia, a national insurance scheme paying for all maternal and newborn care that went into place simultaneously with MotherCare interventions, confounds the association. Costs are typically a major barrier to seeking professional delivery assistance and use of such care increased throughout the country, not just in project sites, in response to the new insurance (figure 14).<sup>5,6,7</sup>

- In Indonesia, while use of skilled birth attendants in the home increased, use of hospital services remained the same over the time of the interventions and Cesarean section rates actually declined. An economic crisis that swept the country beginning in 1997 most likely had a major deterring effect on use of hospital care due to the high fees (figure 15).<sup>7</sup>

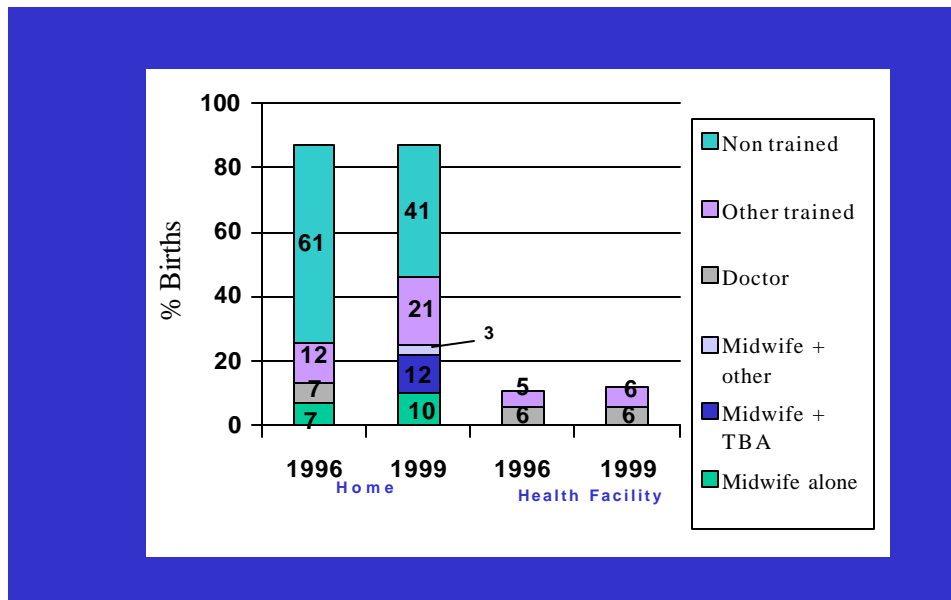
**Figure 13: Increase in Use of a Skilled Birth Attendant –Guatemala, Bolivia, Indonesia-1995-1999**



**Figure 14: Increase in Met Need – Guatemala, Bolivia 1995-1999**



**Figure 15: Skilled Attendance at Birth by Site of Birth, Indonesia, 1996-1999**



## **Safe Motherhood: Historical Lessons for Implementation**

### **1. How can services for Safe Motherhood be implemented?**

Four basic models for implementing delivery care are associated with reducing maternal and perinatal mortality over time.<sup>1</sup> Because maternal and perinatal death happen most frequently around the time of labor and delivery, these models use the key organizational characteristics of *where* a woman gives birth and *with whom* she delivers. At one end of the spectrum (*Model 1*) is a home delivery with a non-professional (including traditional birth attendants, relatives and other community workers with brief health training). At the other end of the spectrum (*Model 4*) is delivery in a facility with comprehensive essential obstetric care by a clinically skilled birth attendant (SBA) (table 5).

We have used this framework of models to analyze historical data from developing countries that have successfully lowered their maternal mortality ratio (MMR) to  $\leq 100$  maternal deaths per 100,000 live births (table 6). Our analysis provides the following insights into success:

- Success in a Model 1 setting (home delivery by lay persons) is the exception, not the rule. In most places where this Model holds, mortality is staggeringly high. Unfortunately over 50% of women in developing countries deliver in a Model 1 setting. Even in the successful cases, there is no evidence that delivery with a lay birth attendant can result in MMRs below 100 per 100,000 live births or a PMR below 30/1000 births. Success in this setting pivots on whether :
  - the village-level providers or family member recognize complications and appropriately treat or refer the mother or newborn with complications,
  - the family then seeks appropriate treatment, and
  - if such treatment is available and accessible.
- Introducing a skilled birth attendant into the equation (Models 2 to 4) and establishing strong referral mechanisms readily reduces the MMR to 50 or below.
- Model 4, arguably the most advanced model, does not necessarily bring MMRs to below 100. For example, in Mexico City the MMR remains  $>100$  despite the fact that over 90% of births occur in hospitals.<sup>2</sup> This ratio is largely due to poor quality of care.
- Once in place, Model 4 is difficult to reverse. Women who want to attend a hospital for birth, usually want the “best,” typically the referral hospital. These facilities then become overwhelmed with normal births at much greater cost.

***Models 2 and 3 are the optimum models that should be replicated.*** Normal deliveries (which make up  $\geq 90\%$  of births) can be attended at lesser cost at health centers or birthing centers (and presumably in the home) with professionals than in referral hospitals. Backed with a strong referral system, MMRs can reach low levels (12 in The Netherlands, 30 in Sri Lanka). (See section Safe Motherhood- How much does it cost?) Family planning should be a component of all safe motherhood programs. It contributes significantly to the reduction in the numbers of maternal deaths by decreasing unwanted births and pregnancies of women at medical risk.

**Table 5: Successful Models of Safe Motherhood: Features of Service Delivery**

Who delivers	-----Where Delivers-----		
	Home	Basic EOC Facility	Comprehensive EOC Facility
<b>Non-Professional</b>	<p><b>MODEL 1</b></p> <ul style="list-style-type: none"> <li>• Home deliveries by community member trained briefly</li> <li>• Transport</li> <li>• Referral support</li> </ul>		
<b>Professional</b>	<p><b>MODEL 2</b></p> <ul style="list-style-type: none"> <li>• Home deliveries by professional</li> <li>• Transport</li> <li>• Referral support</li> </ul>	<p><b>MODEL 3</b></p> <ul style="list-style-type: none"> <li>• Professional provision of Basic EOC</li> <li>• Transport</li> <li>• Referral support</li> </ul>	<p><b>MODEL 4</b></p> <ul style="list-style-type: none"> <li>• Professional provision of Basic and Comprehensive EOC</li> </ul>



**Table 6: Models of Safe Motherhood: Program /project examples and maternal and perinatal mortality rates**

Who delivers	-----Where Delivers-----								
	Home			Basic EOC Facility			Comprehensive EOC Facility		
<b>Non-Professional</b>	<b>MODEL 1</b>								
	<b>Country</b>	<b>MMR</b>	<b>PMR</b>						
	China (rural)(1994)	115	30						
	Fortaleza, NE Brazil (1984)	120	53						
	Gadchiroli, India (1999)		47.8						
<b>Professional</b>	<b>MODEL 2</b>			<b>MODEL 3</b>			<b>MODEL 4</b>		
	<b>Country</b>	<b>MMR</b>	<b>PMR</b>	<b>Country</b>	<b>MMR</b>	<b>PMR</b>	<b>Country</b>	<b>MMR</b>	<b>PMR</b>
	Malaysia (early 1970s to early 1980s)	50	18	Malaysia (mid 1980s to 1990s)	43	11.4	United Kingdom	9	8
				Sri Lanka	30	25	United States	12	10
				China (semi-rural 1986)		17.1	Mexico City (1989)	114	
South Africa (1995)					26				

## 2. What factors contributed to reduced maternal and newborn deaths in these historically successful countries?

China, Sri Lanka, and a few other resource-poor countries have succeeded in reducing their maternal and newborn mortality. Factors leading to their success include *strong political leadership* and *commitment to equity for all* in terms of access to health care, *training and deployment of community-level providers with links to referral systems, home-based care prior to facility-based care, communications to increase demand* for use of these frontline birth providers, and *accountability* of providers to ensure progress. Such programming resulted in a MMR of 115 in rural China in 1994,<sup>3</sup> and a MMR of 30 in Sri Lanka in 1994.<sup>4</sup> These reductions are 10- to 70-fold less than the MMR levels reported 40 to 50 years before (figure 16).

More specifically:

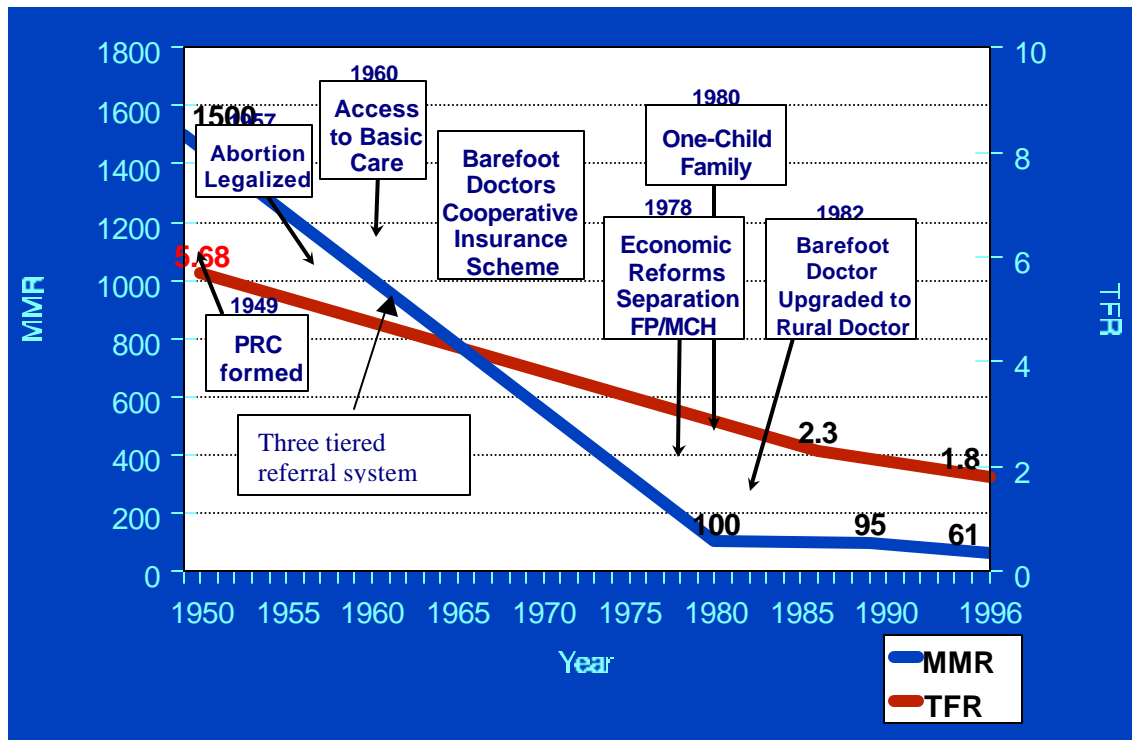
- ***Policy promoting health care typically, free to all***  
The aim of policy in historical cases, such as that in Sri Lanka in the 1930s or China in the 1950s, did not focus specifically on maternal or newborn mortality, rather on equity of health care for all.
- ***Training and deployment of a health worker at the community level with referral support***  
Different countries supported different community-level providers as the backbone in implementing policy--barefoot doctors were selected in rural China, while Malaysia and Sri Lanka pursued skilled midwives. Training of these front-line providers differed—3 months for barefoot doctors versus 18 months for midwives. China overcame the problem of short-term training and varying educational levels of barefoot doctors by supporting them with a three-tiered system for referral. Barefoot doctors could refer difficult cases to township or county hospitals, which in turn could refer to specialized hospitals. Malaysia supported their home-based birthing system with rural nurses who could assist the midwives with antibiotics and other essential drugs in the home, and with free transport to free hospital care if needed.
- ***Home-based care prior to facility-based care***  
In all three of these successful countries, the frontline providers in the woman's home initially provided antenatal, labor/delivery, and immediate postpartum care. With government leadership, this focus shifted to facilities after the majority of women used skilled birth attendants in the home.
- ***Creating demand among women for the new birth providers***  
The Chinese pursued a series of communications campaigns to transition from the traditional birth attendant (the primary birth attendant prior to 1950) to more skilled home birth attendants. These campaigns included prenatal health care; new birth methods that emphasized cleanliness, recognition of specific signs of problems (e.g., hand or leg presentation, retained placenta), and the need for higher-level medical care when the specific problems were witnessed. Traditional birth attendants who did not participate in these new ways were vilified.<sup>5</sup>

Malaysia pursued partnering with traditional birth attendants. TBAs were registered, trained in sterile techniques, invited to all health center functions, and most importantly, valued for their support of mothers in the days following delivery. Over time, the midwife took the place of the TBA in conducting labor and delivery in the home while the TBA continued to provide social support to the mother and newborn in the first days of life. In essence, the midwife and the TBA became partners concerned with a healthy birth.<sup>6</sup>

- **Accountability**

Public accountability of providers played a major role in maintaining the low MMR in the Chinese countryside following a switch to fee-for-services in the early 1980s, and in reducing the MMR in the last two decades in Malaysia. Since the 1990 World Summit for Children, China has given high public visibility to maternal mortality reduction. For example, governors must annually provide information on the MMR of their province; they in turn hold their provincial, county and township level officials accountable for the local MMR. Malaysia holds hospitals accountable for their quality of care, using indicators of case management (e.g., incidence of eclampsia and puerperal sepsis) to determine progress. As in China, those responsible must publicly state, on an annual or semiannual basis, whether or not they have achieved their targets and their plans for improvement.<sup>6</sup>

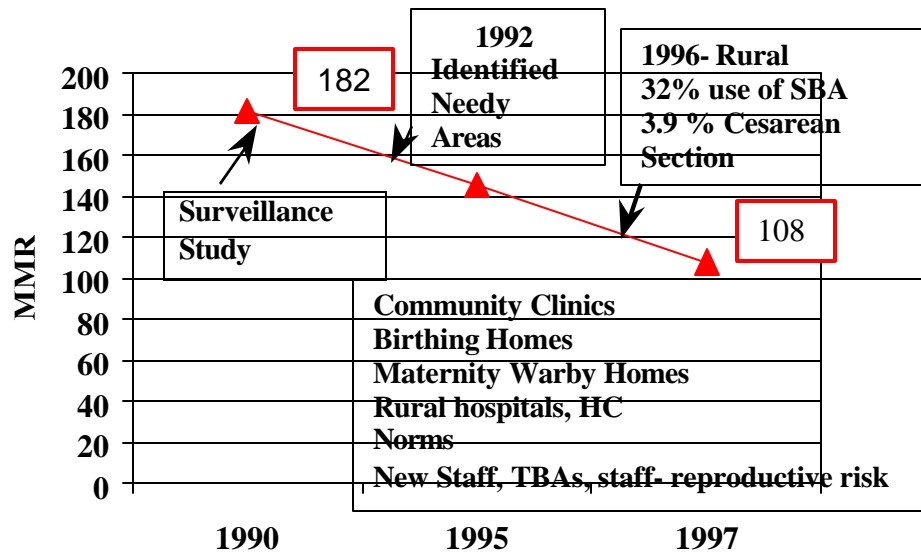
**Figure 16: Maternal Mortality Ratio in China, 1949-1994**



### 3. Can other resource-poor countries achieve a lowered MMR more rapidly?

While China, Sri Lanka and Malaysia took decades to reduce their maternal mortality, Honduras reduced its MMR from 182 to 108, a 37% decline in just six years between 1990 to 1997.<sup>7</sup> A major difference between the historical success stories above and the success in Honduras is that *Honduras' policy explicitly targeted maternal mortality reduction*, rather than equity of health care for all (figure 17).

**Figure 17: Maternal Mortality Rates in Honduras, 1990-1997**



Shocked and stimulated by a surveillance study reporting a higher than desired MMR in 1990, the Honduras Ministry of Health strategically planned for maternal mortality reduction through multiple strategies. A survey identified the needy areas towards which resources for infrastructure and donor support were directed. Simultaneously, a policy that aimed at decentralization of the health system enhanced community involvement. Six years later, the results in rural areas showed a 33% increase in the use of a skilled birth attendant (from 24% to 32% between 1990-1 and 1996, respectively),<sup>8</sup> a slight increase in the use of Cesarean sections, and more maternal deaths occurring in facilities than previously, implying a shift of complicated cases to hospitals though still not in time to be saved.

Infrastructure improvements included new community health clinics, maternity waiting homes, community-built birthing homes, and dozens of rural health clinics and several rural hospitals in the areas of need. Norms were published; more health staff were hired, trained and deployed; TBAs and health personnel were oriented to women with “reproductive risk;” and TBAs were “integrated” into the health care system. Decentralization stimulated local communities to use resources to resolve community issues and to develop birthing centers and maternity waiting homes.

Motivated by the information contained in the surveillance study, Honduras' efforts to target specific geographic areas with the highest MMRs have paid off. Assessing and targeting resources for mortality reduction in needy areas, guided by strong policy, and accompanied by community efforts to create demand for the use of the services, and in some cases mandating accountability of providers for the quality and results of their work, have been the corner stones of programs that have successfully transitioned from birthing with traditional workers at home to skilled birth attendants in the home or in a basic EOC facility, in Honduras as well as in Malaysia<sup>1</sup> and a rural district in South Africa.<sup>9</sup>

## Safe Motherhood: How much does it cost?

### 1. What are the costs of maternal health care services?

Prior to the mid-nineties, cost estimates for maternal health services were based on theoretical constructs. By the end of the nineties, country studies in Africa and Latin American reporting actual country costs for these services became available. In Bolivia, 1998, for example, the cost of maternity care, including antenatal, labor and postpartum care, was approximately \$2.84 *per capita* with 60% coverage of services. If services were provided according to the Government plans, with *the level of quality as specified in the evidence-based treatment guidelines and coverage at 90%*, the cost would increase to approximately \$6.84 *per capita* (table 7), an additional \$4.00 *per capita*.<sup>1</sup>

Bolivia's present costs are similar to those derived from theoretical models: \$1 to \$2 *per capita* in low income countries and \$5 to \$6 *per capita* in higher income countries.<sup>2</sup> In 1987, Herz and Measham estimated a *per capita* cost of approximately \$2 for a "three-pronged strategy of providing prenatal care, basic health care and family planning services at the community and first-referral levels..." Low income countries spent approximately \$23 per capita annually on health care during 1990-98.<sup>3</sup>

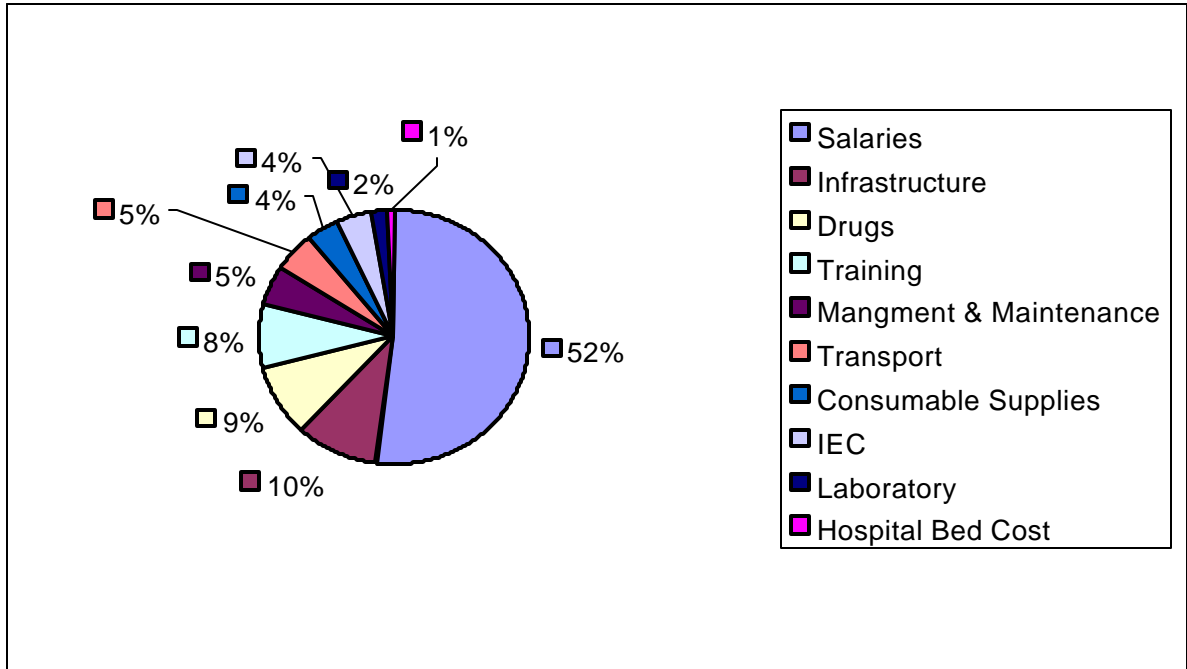
**Table 7: Actual and Estimated Costs of Comprehensive Maternal Health Services**

<b>MotherCare Bolivia, 1998<sup>1</sup></b>	<b>World Bank, 1993<sup>2</sup></b>	<b>World Bank WHO Mother-Baby Package, 1997<sup>2</sup></b>
<ul style="list-style-type: none"> <li>• \$2.84 <i>per capita</i> according to current practices.</li> <li>• \$ 6.83 <i>per capita</i> according to evidence-based treatment guidelines at 90% coverage.</li> </ul>	<ul style="list-style-type: none"> <li>• \$1.00 <i>per capita</i> in poor isolated areas.</li> <li>• \$2.50 <i>per capita</i> areas with some service infrastructure and less isolated.</li> <li>• \$5.00 <i>per capita</i> in areas with extensive infrastructure and resources.</li> </ul>	<ul style="list-style-type: none"> <li>• \$2.50 <i>per capita</i> in high fertility; low income countries.</li> <li>• \$6 <i>per capita</i> with lower fertility; higher prevalence of hospital deliveries.</li> </ul>

## 2. What are the component costs of maternal health services?

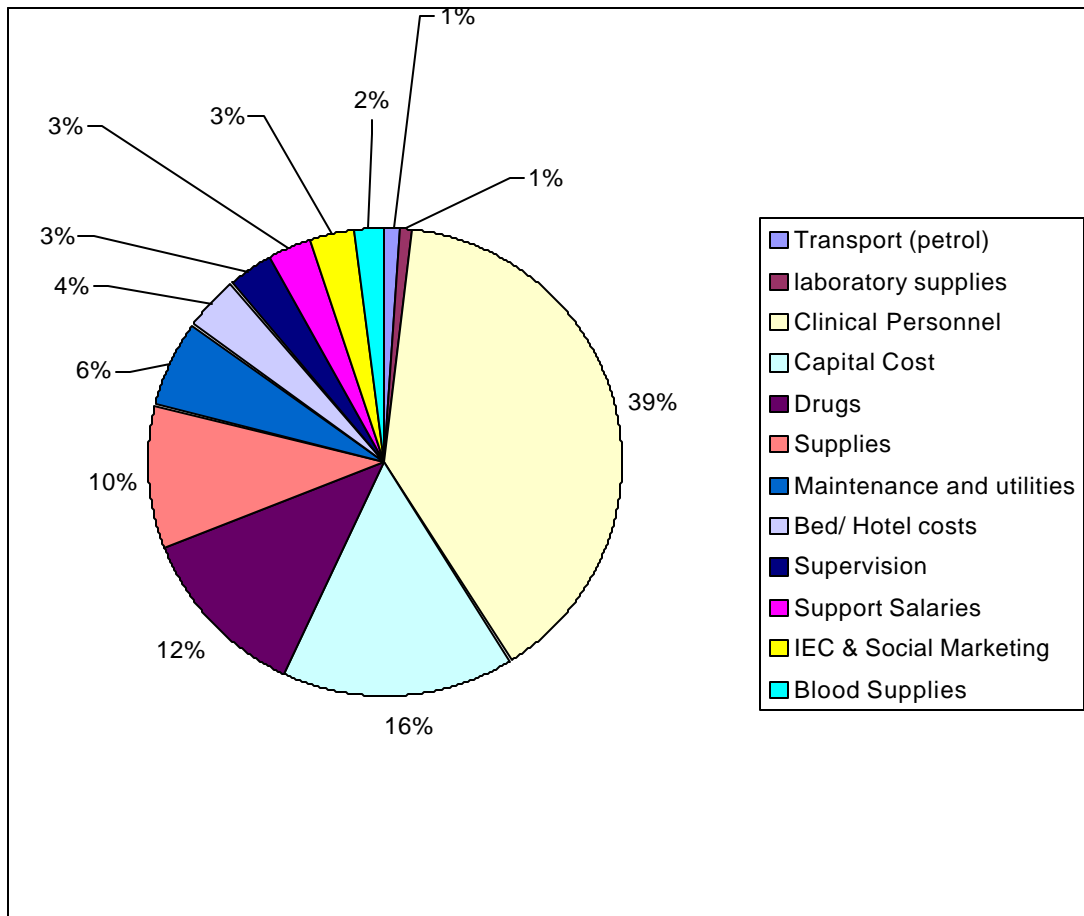
In Bolivia, salaries account for the greatest proportion of maternity care costs at 52% due to the large number of physicians providing maternal health services (figure 18).<sup>1</sup> Similar percentages were found for salaries in other studies in Uganda and Kenya.<sup>4,5</sup>

**Figure 18: Costs by Input of Service Components, Bolivia 1998**



These percentages of costs for maternity care for each component are similar to those projected by the World Health Organization for the Mother-Baby Package: The highest percentage of total cost is attributable to salaries at 39% in a low income country scenario. In a middle income country, the salary component may account for an estimated 70% of total costs due to higher salaries for personnel in a higher income area (figure 19).<sup>6</sup>

**Figure 19: Costs of the WHO Mother-Baby Package by Input (low income scenario), 1997**



Labor costs are extremely sensitive to the:

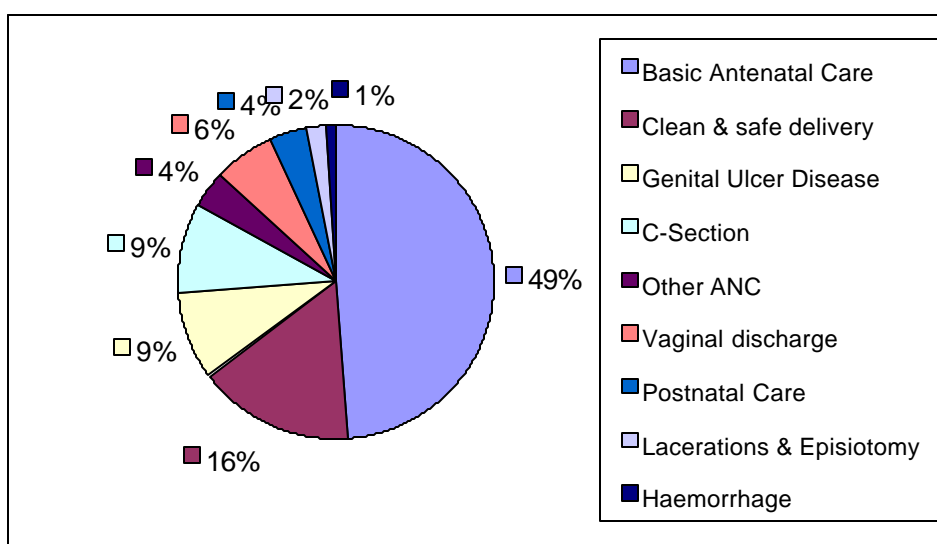
- Efficiency of staffing patterns: numbers of staff, categories (midwives versus physicians), local salary scales and government policies directing staff deployment. A cost study in Uganda in 1998 found that if the numbers of midwives in the maternity were reduced from the present level of 25 to 7 midwives, each of the 7 midwives would assist at 142 deliveries per year rather than the present workload of 39 per midwife per year and would account for 40% reduction in the staff salaries per year.<sup>7</sup>
- Client volume and case mix (routine versus emergency care requiring specialists);
- Physical location: urban versus rural; health center versus hospital; public versus private;
- Country resources: low versus high-income countries.



### 3. What are the commodity costs for quality reproductive health services in developing countries?

In 1998 the Zambian Government launched the national health sector reform strategy to improve the quality of health care. As part of this reform, the Ministry of Health developed a National Drug Policy and increased the pharmaceutical budget. To arrive at the level of increase required for quality services, the MOH assessed the availability of reproductive health (RH) drugs, medical supplies and equipment and identified the cost of projected needs according to evidence-based treatment guidelines.<sup>8</sup>

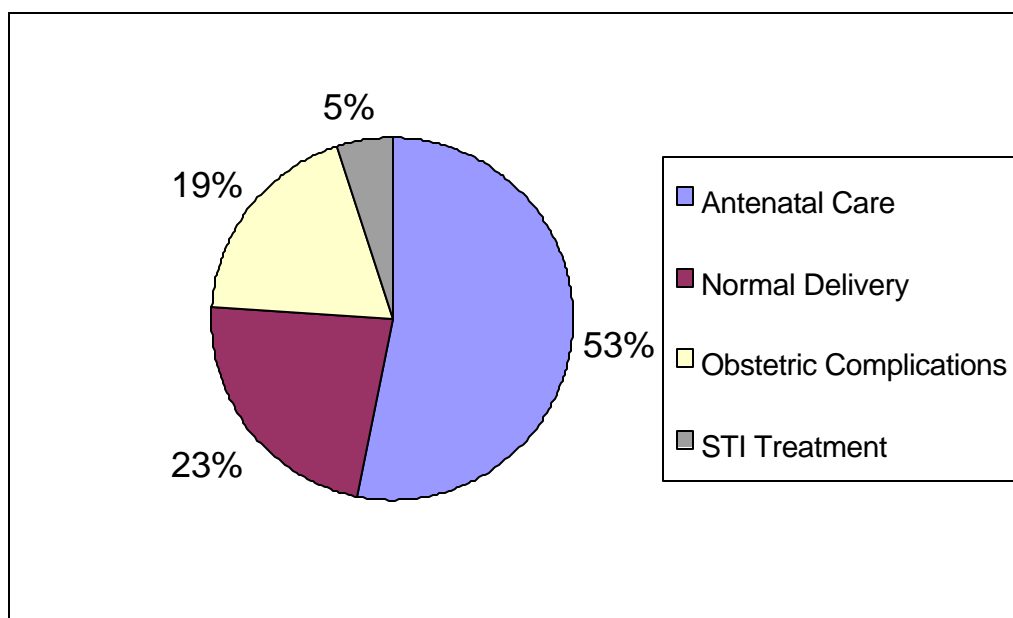
**Figure 20: Percent of Total RH Commodity Costs based on Local Prices, Zambia 1998**



In Zambia, family planning commodities account for approximately 70% of the total Zambian RH commodities budget (not included in figure 18). With family planning commodities excluded, antenatal care accounts for approximately 50% of the remaining costs (using local prices, figure 20).

A similar study carried out in Kenya, 1997 (figure 21), found that commodity costs for antenatal care and vaginal deliveries accounted for the highest percentage of RH commodity costs with a much smaller percentage attributable to managing obstetric complications. Family planning commodities are again excluded from the total commodities budget. The cost of Cesarean sections accounts for 60% of commodity costs for obstetric complications. The per client cost for treatment of complications, such as puerperal sepsis, may be eight to nine times higher than the per client cost for one antenatal visit, but because such treatments are less frequent, the budget for management of obstetric complications is less than for the maternity services provided to all women.<sup>5</sup> To fully implement the Kenyan evidence-based treatment guidelines for 15 RH conditions, would require 65% of the total MOH 1997 annual budget for all treatment, drugs and medical supplies, for all health services.

**Figure 21: Kenya: Estimated Overall Annual Requirements for RH Drugs and Medical Supplies in Public Facilities, 1997**



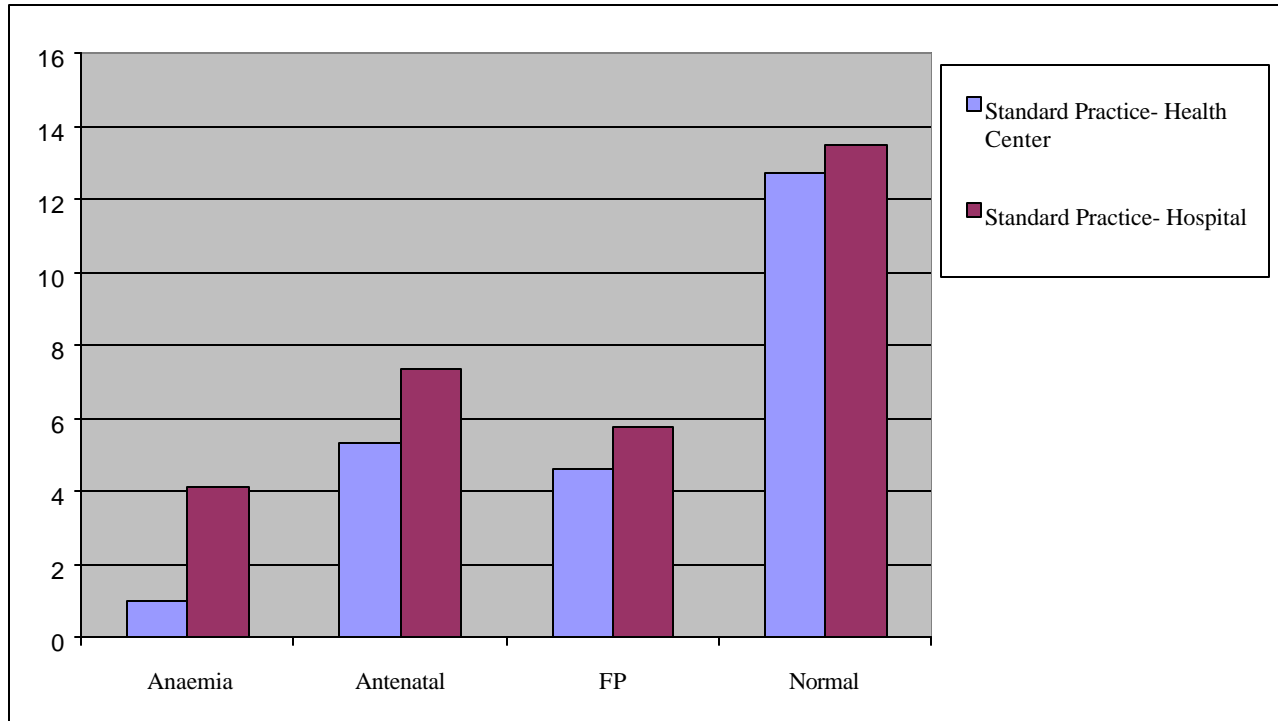
Costs of commodities may fluctuate considerably and are influenced by such factors as:

- procurement procedures and contracts;
  - treatment standards and choice of drugs;
  - treatment for basic care (normal deliveries, antenatal care versus obstetric complications);
- and
- volume of clients.

**4. What cost-savings are implied by providing basic essential obstetric care (BEOC) services at health centers versus referral hospitals with EmOC capabilities?**

The cost savings realized by delegating the management of antenatal care, anemia control, family planning and normal delivery to a "BEOC capable" health center is substantial, given the volume of clients for each of these services (figure 22). The total cost savings per client for these four services provided at health centers versus hospitals in Uganda would be approximately \$7.00.<sup>4</sup> Providing these services closer to the community is also more cost beneficial for the clients who must assume transportation and other logistical costs.

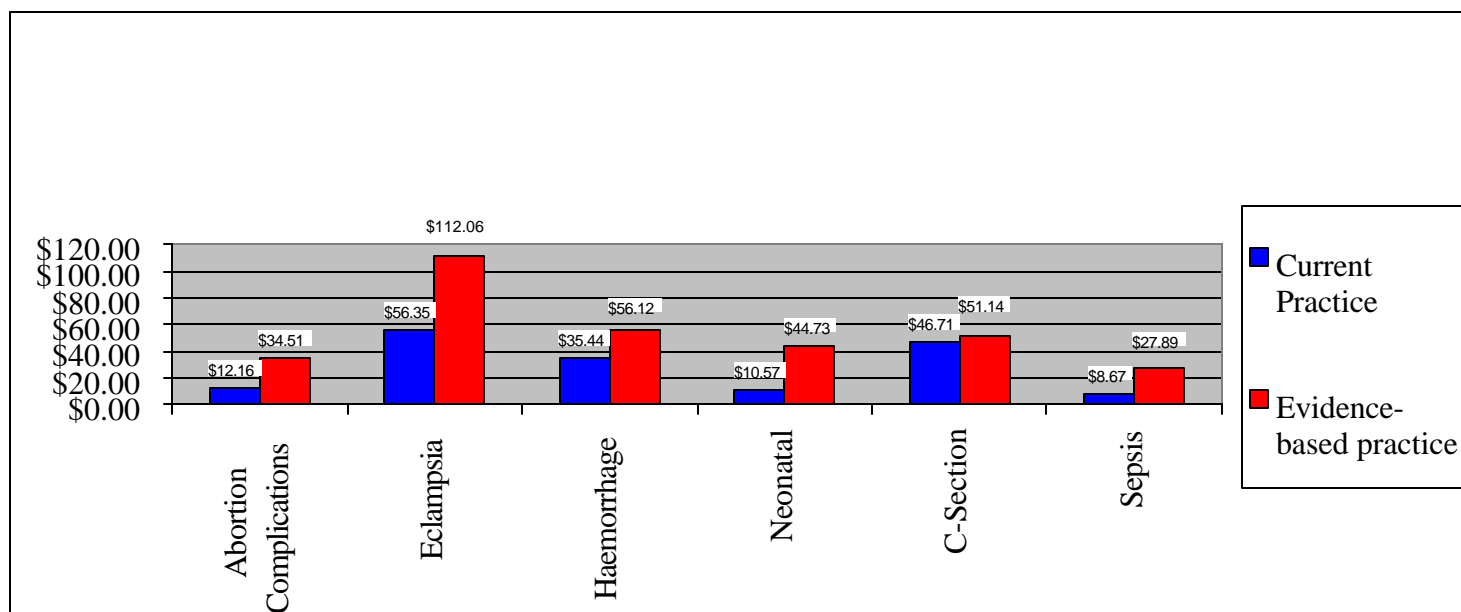
**Figure 22: Cost of BEOC and Family Planning: Health Center vs. Hospital, Uganda, 1998**



**5. What are the cost implications of improving quality of care through the use of evidence-based treatment guidelines?**

In Uganda, as in Bolivia, the costs associated with implementing evidence-based treatment guidelines are higher than those associated with current, non-standardized treatment practices (figure 23).<sup>4</sup> For example, the Government of Uganda currently spends about \$0.05-\$0.60 per capita to provide maternal and neonatal care. To implement treatment according to the Mother-Baby Package evidence-based guidelines would cost approximately \$1.40 per capita. This represents a *per capita* increase of approximately \$1.00. In Bolivia, as stated above, national implementation of evidence-based treatment guidelines would necessitate an additional \$4.00 *per capita*.

**Figure 23: Uganda: Cost of Implementing EmOC with Evidence-Based Treatment Guidelines versus Current Practices at Referral Hospital, 1998**



**6. How does the integration of Family-Centered Maternity Care impact the quality and cost of maternal and newborn delivery services?**

*According to both women and providers, integration of the Family-Centered Maternity Care (FCMC) approach increases the quality of maternal and newborn care during delivery and is cost-effective.*

Emphasizing education, preparation of the woman and her family for childbirth, and active participation of the woman and her partner during the birthing process, the approach is grounded in evidence-based medicine. Comparing the FCMC approach with traditional birthing practices in Ukraine found clear cost savings from the former approach, primarily due to the decrease in invasive procedures.<sup>9</sup> Also results showed no evidence of adverse outcomes from using the FCMC approach.

Since FCMC allows for flexibility in the birthing process, there were variations in the degree of integration of FCMC. Results showed "the purer" the FCMC approach employed, the greater the cost savings, ranging from \$7.35 to \$16.49 per patient. The greatest cost savings came from a reduction in commodities used. Since families generally pay for these supplies, the woman and her family are seen as the principal beneficiaries of the cost-savings.

**7. Considering the apparent costs of implementing quality maternal health services, what recommendations can be made to countries for cost-saving measures that will not jeopardize quality of care?**

Most governments are providing some routine maternity care services for their population and to a lesser degree BEOC and EmOC services. However not all governments are looking at the

potential cost efficiencies in the provision of services that can come with assessing, for example, staffing patterns, epidemiological factors influencing the case mix, or the cost-effectiveness of provider practices. To that end, the cited studies and others are very useful in pointing out how maternal/reproductive health budgets could be more effectively allocated and monitored as listed in box 6.

**Box 6: Cost-Saving Recommendations for Provision of Reproductive/Maternal Health Services**

- **Provide basic essential obstetric care at health centers rather than at referral hospitals rather than at referral hospitals:** *BEOC services can be provided by non-physicians, particularly clinical midwives, at health centers and at referral hospitals. Services closer to the community will also incur a cost-savings for the clients.*
- **Streamline staffing patterns at hospitals and health centers as dictated by volume of clients and epidemiological demands.**
- **Delegate routine maternal health services to clinically trained midwives.**
- **Conduct a cost-effective analysis of evidence-based treatment guidelines to ensure selection of the most cost-effective drugs and the costs for necessary supply item.;**
- **Monitor appropriate use of guidelines by clinicians, specifically over and under prescription of drugs and diagnostics and unnecessary, often invasive and costly practices.**

## **Safe Motherhood Indicators: Measuring Progress**

### **1. Why has measuring maternal mortality and morbidity presented such a challenge?**

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 large sample sizes, generally making this method too expensive. While initially there was optimism that the sisterhood method (an indirect estimate of maternal mortality) could gather the required information with a smaller sample size (which it can), it can only give a retrospective estimate of the Maternal Mortality Ratio (MMR) for the past 10-12 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, especially in those areas/countries where a large proportion of the births take place at home.

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 unambiguous 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.<sup>1</sup>

Since neither the maternal mortality ratio (MMR) nor the severe 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.

### **2. Which process indicators currently work?**

- *Who delivers the woman?*
- *Where does she deliver?*
- *Cesarean section rate*

Stratified by urban and rural populations, these indicators can give a general sense of how women are presently giving birth, at a district, regional or national level. These indicators can be gathered through routine data collection systems or population-based surveys. Broadly they give some understanding of access issues. The Cesarean section rate may also indicate availability of

a specific service required to manage maternal complications, and hence, is a component of quality of care; it has also been used as an indicator of the met need.

### **3. Which process indicators need work?**

- *Met Need*
- *Unmet Obstetric Need (UON) for Major Interventions*
- *Case Fatality Rate (CFR)*
- *Referral Rate*

Most usefully applied at a district or provincial level, the two access indicators, *Met Need* and *UON*, tell us respectively whether women who need EOC are actually in a site capable of providing such care, or the converse, how much obstetric need is still unattended in the area. *Met Need* relies on an estimate of serious complications as the standard against which progress is measured (WHO has estimated that 15 percent of women with live births suffer a serious complication warranting Essential Obstetric Care).

The *Unmet Obstetric Need* measures progress using a standard based on the area's programmatic reality, a reference rate derived locally. In Morocco, for instance, the reference rate was one percent of women using EOC in an urban area where access is not an issue. This reference rate is less than the 15 percent used in the *Met Need* indicator. The difference between the 15 percent (*Met Need* estimate) and the one percent (*UON* reference rate) is due to the complications allowed in the definition of each. The *Met Need* indicator allows a wider array of direct obstetric complications than those in the *UON*. However, given that both indicators are based on the diagnosis of direct obstetric complications, a skilled provider must be involved. The birth (or delivery room) registers are the primary tools for collecting both indicators. These indicators are presently not collected through routine health information systems, nor can they be determined through population-based surveys.

The two quality of care indicators, *Case Fatality Rate* and *Referral Rate*, need more field testing to determine when to use them, and how to interpret them. Therefore, alternatives to these quality of care indicators are needed. One alternative is by collecting some of the quality of care information through the Maternal Death Audit.

### **4. Is evaluation of Safe Motherhood programs useful?**

Evaluation is a valuable tool for improving health programs and using resources wisely. Even if programs are not amenable to experimental approaches because of the inability to measure the preferred health outcomes of mortality or morbidity, and because interventions for Safe Motherhood programs are usually a comprehensive package delivered to communities, not individuals, it is possible to design effective packages and to evaluate them. Descriptive (before and after) rather than experimental (randomized control trials) study designs can be used for evaluation unless the intervention can be generalized broadly to many settings.<sup>2</sup>

## **Safe Motherhood: Policies for Quality Programs**

### **1. Should policy be a main focus of Safe Motherhood programs?**

*Yes, strong policy is consistently the backbone for all developing countries that have successfully reduced their maternal mortality.*

Malaysia, Sri Lanka, Honduras—all had strong policy to guide the transition of their birthing services from home births with a community member (Model 1) to birthing with a skilled attendant (Model 2 or 3).<sup>1</sup> Yet donors and others have focused much attention on various component parts of Safe Motherhood, such as training, rather than looking at the larger picture. Given the level of skills, even of skilled providers, as shown earlier, a focus on training is certainly warranted. Similar findings also come from a recent survey of program effort in 49 countries,<sup>2</sup> ranking whether or not they carried out refresher training for midwives at 55 on a scale of 100—meaning they could have as easily had such training as not had such training. And for doctors having training in normal delivery care, the chances are less: about 4 in 10.

But there are several other problems with the system of care as well:

- ***Deployment of trained personnel does not promote quality care.*** In Guatemala, for example, there is no maternity team in any hospital. Due to personnel shortages, all personnel rotate through all departments, meaning all must become competent in delivery skills. In Bolivia, 70% of the health care staff in the MotherCare areas transferred within a three-year period. And in Indonesia, with its recent deployment of village midwives, there was a 20% turnover at the village level in a three year period.
- ***Facilities that are equipped to provide EOC or EmOC are not readily available.*** The maternal neonatal program effort in 49 developing countries<sup>2</sup> found that:
  - 64% of district hospitals have trained staff who can perform Cesarean sections;
  - 53% of district hospitals have blood transfusion capability;
  - at the health center level, 45% have staff who can use a partograph to determine when to refer a woman, and only 24% can perform manual vacuum aspiration

A Kenyan study in 1998<sup>3</sup> found:

- Only 9% of all facilities had the necessary stock to treat 22 reproductive health conditions;
- 40% of the hospitals had essential equipment for obstetric surgery;
- 53% of the hospitals and 17% of the health centers had essential normal delivery equipment;
- 50% of the women purchased commodities for their deliveries, such as gauze and gloves; and
- major discrepancies persisted between recommended treatment and services and the actual knowledge and practices of the providers.



A study in Benin<sup>4</sup> found that:

- only a quarter of the 100 referral hospitals reviewed had performed all EmOC services in the previous 3 months; and
- only 15 hospitals had the capacity to carry out EmOC services on a 24 hour basis.

## **2. What policies are needed?**

- ***Policies that promote and maintain provider performance based on best practices, such as those that:***
  - require clinical practice according to evidence-based nationally approved standards;
  - support dynamic pre-service training curricula that allow periodic modification and update based on current knowledge of evidence-based medicine;
  - define a continuing education program for all practicing providers;
  - support provider best practices, such as peer review, monitoring and supervision systems;
  - require licensure of providers and certification and accreditation of medical facilities; and
  - create incentives that sustain provider motivation.
- ***Policies that promote sensitivity and responsiveness to client and community cultures and needs, including :***
  - sustain a client-centered approach in the provision of all services;
  - maintain the availability and accessibility of 24 hour services; and
  - engage the community for their input and feedback regarding service provision.
- ***Policies that support best practices through the necessary infrastructure and organization:***
  - deploy essential staff on a rational basis;
  - guarantee procurement and distribution of essential drugs and supplies at affordable prices;
  - support health care financing systems that are viable and affordable;
  - ensure an equitable provision of health care to minorities and "high risk populations;" and
  - facilitate referral systems through functional teams of providers and across the different levels of facilities.

## References and Notes

### The Context: Maternal and Perinatal Morbidity, Mortality and their Consequences

1. Burkhalter BR. *Consequences of Unsafe Motherhood in Developing Countries in 2000: Assumptions and estimates from the REDUCE model*. September 2000. This model is based on:
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2. World Health Organization. *Perinatal Mortality: A Listing of Available Information*. Geneva, World Health Organization, 1996. The numbers are adjusted for developing countries, 2000, using 116,414,000 live births from UN Population Division 1999 report.
3. Alauddin M. Maternal Mortality in Rural Bangladesh: The Tangail District. *Studies in Family Planning* 17(1):13-21, 1986; Bhatia, JC. Levels and Causes of Maternal Mortality in Southern India. *Studies in Family Planning* 24(5):310-317, 1993; Fauveau V et al. *Causes of Maternal Mortality in Rural Bangladesh, 1976-85. Bulletin of the World Health Organization*, 66(5):643-651, 1988; Kane TT et al. Maternal Mortality in Giza, Egypt: Magnitude, Causes and Prevention. *Studies in Family Planning* 23(1):45-57, 1992; Koenig MA et al. Maternal Mortality in Matlab Bangladesh: 1976-85. *Studies in Family Planning* 19(2):69-80, 1988; Li XF, Gu ML. Analysis of the maternal mortality in Sichuan Province, 1985-1997. *China National Perinatal Medical Congress Proceedings* 1:25-28, 1990. Data translated by author, 2000.

Five population-based studies measured when maternal death occurred. Maternal death occurring during both the intrapartum period and between 0-24 hours postpartum was utilized when available. Some studies (Kane) did not include a timeframe for intrapartum deaths and only those deaths from 0-24 hours were included. In studies that included a time frame different than 0-24 hours, such as 0-7 days, deaths were evenly allocated across the days. It is more likely that a greater proportion of deaths occurred in the earlier part of the period, thus the Fauveau and Alauddin data may be underestimates.

**Table 1: Maternal death during labor/delivery and 24 hours after delivery**

Country	Total maternal deaths studied	Percent mortality during labor/delivery and within 24 hours postpartum
<b>India</b> ( <i>Bhatia, 1993</i> ) Rural	262	25.6%*
Urban	22	31.8%*
<b>Bangladesh</b> ( <i>Fauveau, 1988</i> )	387	25.0%
<b>Bangladesh</b> ( <i>Alauddin, 1986</i> )	48	23.0%
<b>China</b> ( <i>Li, 1990</i> )	61	27.9%
<b>Egypt</b> ( <i>Kane, 1992</i> )	156	32.0%
<b>TOTAL</b>	936	Wt. Avg. 26.8%

\*Antepartum deaths, incorporated by the author as deaths occurring the ‘ same day’ as delivery, are not included.

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The information on perinatal deaths during delivery and 0-24 hours post delivery was taken from four population-based studies in developing countries. Data on fresh stillbirths were included as it was assumed these perinates died during labor. While the Stott and Pratinidhi studies only had general stillbirth information (fresh and macerated combined), we assumed half of these were fresh stillbirths.

**Table 2: Perinatal death during labor/delivery and first 24 hours after birth**

Country	Number of perinatal deaths studied	Percent of perinatal deaths during delivery and within 24 hours postpartum
<b>Jamaica</b> (Coard, 1991)*	2069	44.0%
<b>Malawi</b> (McDermott, 1996)	263	54.8%
<b>Indonesia</b> (Stott, 1997)** Rural Lombok	120	47.5%
Urban Mataram	64	43.8%
Sumbawa	38	47.4%
<b>India</b> (Pratinidhi, 1986)**	152	49.0%
		Wt. Avg.45.8%

\* Includes fresh stillbirths, macerated stillbirths if occurred during labor and death between 0-24 hrs

\*\* Assumes half of stillbirths are fresh and occurring intrapartum

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The World Health Organization's (WHO) Maternal and Safe Motherhood Programme produced the Mother-Baby Package to help countries package a set of interventions needed to reduce maternal and neonatal mortality and morbidity and also developed a



companion manual, "WHO Mother-Baby Costing Spreadsheet" to help local programmers estimate the cost of implementing the Mother-Baby package. The interventions in the package include antenatal and delivery care, the management of obstetric and neonatal complications and postpartum care, including family planning. Costs are estimated based on the target population who will benefit from these services, treatments according to the Mother-Baby Package Standards, and allows cost calculations for different levels of service - health post, health center, hospital. A set of worksheets provides the guidelines for estimating these costs.

Mother-Baby Package: Implementing safe motherhood in countries.  
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The CES model can be used as a complementary tool with the Mother-Baby package to provide precise drug and supplies information regarding the treatment of maternal and neonatal conditions. It allows planners to appreciate the cost of particular treatment regimes and enables cost reduction through the use of alternative drugs.

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