

MATERNAL MORTALITY UPDATE 2004



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Since 1998, the *Maternal Mortality Update*, a regular publication of UNFPA, has documented strategies, partnerships and projects for reducing maternal mortality and morbidity in the developing world. The 2002 *Maternal Mortality Update* was a collaboration between UNFPA and Columbia University's *Averting Maternal Death and Disability (AMDD)* programme. It focused on meeting the challenge of reducing maternal mortality through wider access to emergency obstetric care and shared tools and experiences in this effort. This year, the *Maternal Mortality Update* focuses on skilled attendance at delivery for all women, in collaboration with the *Skilled Attendance for Everyone (SAFE)* research study and the *Initiative for Maternal Mortality Programme Assessment (IMMPACT)*, Dugald Baird Centre for Research on Women's Health, the University of Aberdeen. This report, intended as a resource for health programmes and policy makers, analyses the issue of skilled attendance. It will be distributed to UNFPA Country Offices, Country Support Technical Teams, national and international partners, NGOs, ministries of health, bilateral and multilateral donors, and anyone else who wishes to be kept informed of UNFPA's global activities aimed at reducing maternal death and disability. It will also be posted on the UNFPA and SAFE websites.

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preface

In the last decade, ending the tragedy of maternal death has moved from the political back burner into the international spotlight. Increasingly, maternal mortality is being seen as an urgent human rights concern as well as a health issue. The initiative for safe motherhood challenges the inequities between North and South that leave women in poor countries so vulnerable to maternal death.

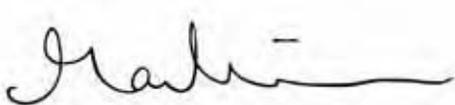
Saving mothers' lives is also widely recognized as an imperative for social and economic development. The inclusion of maternal death reduction in the fifth Millennium Development Goal underscores the global commitment to this issue. While our knowledge of how to avoid this tragedy has grown, maternal death and disability remain critical problems throughout most of the developing world. We strongly endorse a three-pronged strategy to save women's lives: contraceptive services to prevent unwanted pregnancy, skilled care at delivery for all women, and emergency obstetric care for all who develop complications during pregnancy or childbirth.

This publication clarifies the conceptual relationship between skilled attendance and maternal mortality. Skilled care at all births gives those women who develop life-threatening complications a better chance of receiving emergency obstetric care in time. In the back pocket, a companion booklet, *Into Good Hands: Progress Reports from the Field*, provides examples of skilled attendance policies and activities undertaken in various countries by UNFPA and SAFE.

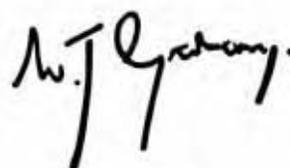
Much of the progress that countries have achieved in improving skilled care at birth can be attributed to close collaboration between ministries of health, NGOs, universities, professional associations, community-based groups and international agencies. These partnerships are well-positioned to emphasize the integration of skilled care at birth and maternal health services into existing reproductive health programmes.

Widening the base of support has also encouraged a comprehensive approach to critical conditions, such as HIV/AIDS and malaria, which increasingly shape maternal outcomes. We consider the collaboration among SAFE and IMMPACT of the University of Aberdeen and UNFPA on this publication as an excellent example of fruitful cooperation. We look forward to working together on the new Partnership for Safe Motherhood and Newborn Health, which has broadened the challenge to include a greater focus on infants, and added new partners to the effort.

Since the global initiative to reduce maternal death was launched 15 years ago, we have refined our strategies to address this problem. We are accumulating evidence and programming experience about what works and what does not. Let us use what we now know to build commitment and mobilize resources towards meeting the fifth Millennium Development Goal to reduce maternal mortality by 75 per cent by 2015. Let us make motherhood a safer experience for all women.



Mari Simonen, Director
Technical Support Division
UNFPA



Wendy Graham, Director
Dugald Baird Centre for Research on Women's
Health, University of Aberdeen

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The University of Aberdeen's contribution was undertaken as part of two international research programmes – SAFE (Skilled Attendance for Everyone) and IMMFACT (Initiative for Maternal Mortality Programme Assessment). Julia Hussein and Birgit Jentsch prepared and coordinated the report on behalf of the University of Aberdeen. Contributions of collaborating individuals, organizations and countries who conducted and participated in the fieldwork for SAFE are also recognized. In addition, individuals in the SAFE International Research Partnership are acknowledged: a list of their names and affiliations appears in the Annex.

A manual (the SAFE Strategy Development Tool) to enable programme managers to systematically gather and interpret information on skilled attendance at delivery is freely accessible at www.abdn.ac.uk/dugaldbairdcentre/safe.

abbreviations

AIDS	acquired immune deficiency syndrome
AD	Africa Division
APD	Asia and the Pacific Division
DASE	Division of Arab States and Europe
EmOC	emergency obstetric care
EOC	essential obstetric care
HIV	human immunodeficiency virus
ICPD	International Conference on Population and Development
MDGs	Millennium Development Goals
MMR	maternal mortality ratio
MOH	Ministry of Health
NGO	non-governmental organization
PRSPs	Poverty Reduction Strategy Papers
RH	reproductive health
SBA	skilled birth attendant
SkAB	skilled attendance at birth
STI	sexually transmitted infection
SWAps	sector-wide approaches
TBA	traditional birth attendant

agencies, organizations and programmes

ADB	Asian Development Bank
AMDD	Averting Maternal Death and Disability (Columbia University)
FCI	Family Care International
FHI	Family Health International
FIGO	International Federation of Obstetrics and Gynecology
ICM	International Confederation of Midwives
IDB	Inter-American Development Bank
IMMPACT	Initiative for Maternal Mortality Programme Assessment
IPPF	International Planned Parenthood Federation
JICA	Japan International Cooperation Agency
JHPIEGO	An affiliate of Johns Hopkins University specializing in reproductive health issues
PAHO	Pan-American Health Organization
RPMM	Regional Prevention of Maternal Mortality Network
SAFE	Skilled Attendance for Everyone
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	US Agency for International Development
WHO	World Health Organization



delivering into good hands: key messages

The Dimensions of Maternal Mortality

- Maternal mortality is the health indicator with the most disparity between developed and developing countries. Almost all maternal deaths (95 per cent) occur in Africa and Asia. In her lifetime, a woman in sub-Saharan Africa faces a 1 in 16 risk of dying during pregnancy or childbirth as compared to a 1 in 2800 risk in the developed world (PAGE 11).
- Nearly two-thirds of maternal deaths worldwide are due to five direct causes: haemorrhage, obstructed labor, eclampsia (pregnancy-induced hypertension), sepsis and complications from unsafe abortion (PAGE 9).
- With an estimated 15 per cent of pregnancies resulting in complications, all pregnancies must be considered at risk. However, all five of the most life-threatening complications can be treated by a professional health worker. Being prepared to address complications is the key to saving the lives of mothers and newborns. This is why skilled attendance is crucial (PAGE 10).

The Millennium Development Goal Indicator

- The fifth Millennium Development Goal (2000) calls for a reduction in maternal mortality and morbidity. One of the indicators used to track progress in meeting this goal is the proportion of women who deliver with the assistance of a skilled birth attendant (PAGE 13).
- Although data for this indicator is widely available in many countries, definitions used for data collection may vary from country to country. Moreover, the indicator does not address the environment in which the delivery occurs (PAGE 13).

Why We Focus on Skilled Attendance

- Historical data indicates that countries successful in reducing maternal mortality have emphasized the role of a professional midwife or doctor working in a health institution. This is true for both developed and developing countries (PAGE 14).
- There is an inverse relationship between the proportion of deliveries assisted by a skilled attendant and the maternal mortality ratio in developing countries (PAGE 15).
- In the developing world, complications from HIV/AIDS and malaria are increasingly becoming indirect causes of maternal death and morbidity. Maternal health services represent a strategic entry point for addressing both malaria and HIV/AIDS in women (PAGE 12).
- Skilled delivery care and emergency obstetric care can protect millions of newborns, as well as their mothers (PAGE 15).

The Way Forward

- Since almost all maternal mortality is avoidable, the death of a woman during pregnancy or childbirth is a violation of her rights to life and health. A human rights-based approach to maternal mortality reduction calls on governments to provide universal access to skilled delivery care and emergency obstetric care. It also promotes dignity and equity for women within the health-care system (PAGES 10-11).
- Investing in human resources is crucial for improving skilled attendance at birth. Critical issues include “brain drain,” salary and benefits, supervision and management, and skills maintenance (PAGE 23).
- In countries with high HIV/AIDS prevalence, the disease must be addressed as a human resources issue as well as a public health concern. Skilled attendants must be supported in taking universal precautions to protect themselves (PAGE 24).
- Given their esteemed role within the community, TBAs can serve as strong advocates for skilled attendance at birth if they are appropriately linked with the health system. Programmes should focus on supporting the social role TBAs play in women’s health rather than investing in developing their technical skills (PAGES 21-22).
- Upgrading delivery care often begins with improving the quality of services offered in facilities. When facilities provide quality services, they become widely used and trusted by community members (PAGE 24).
- There is no single approach to improving skilled attendance at birth. Strategies must be tailored according to local context. Regardless of the approach, the objective is to manage normal labour well and ensure emergency obstetric care for all women who develop complications during childbirth (PAGE 23).

defining terms

A **skilled attendant** is a medically qualified provider with midwifery skills (midwife, nurse or doctor) who has been trained to proficiency in the skills necessary to manage normal deliveries and diagnose, manage, or refer obstetric complications. Ideally, skilled attendants live in, and are part of, the community they serve. They must be able to manage normal labour and delivery, perform essential interventions, start treatment and supervise the referral of mother and baby for interventions that are beyond their competence or not possible in a particular setting.

Skilled attendance refers to a skilled attendant operating within an enabling environment or health system capable of providing care for normal deliveries as well as appropriate emergency obstetric care for all women who develop complications during childbirth.

Skilled care is another way of expressing skilled attendance. Many people prefer this term to avoid confusion between “skilled attendants” and “skilled attendance”, especially when spoken.

The **enabling environment** describes a context that provides a skilled attendant with the backup support to perform routine deliveries and make sure that women with complications receive prompt emergency obstetric care. It essentially means a well-functioning health system, including equipment and supplies; infrastructure and transport; electrical, water and communication systems; human resources policies, supervision and management; and clinical protocols and guidelines.

A **traditional birth attendant (TBA)** is a community-based provider of care during pregnancy and childbirth. TBAs are not trained to proficiency in the skills necessary to manage or refer obstetric complications. TBAs are not usually salaried, accredited members of the health system. Although they are usually highly esteemed community members and are often the sole providers of delivery care for many women, *they should not be included in the definition of a skilled attendant for the calculation of the Millennium Development Goals indicator.*





where we stand in the challenge to save mothers' lives

Having a health worker with midwifery skills present at every childbirth, backed up by transport in case emergency referral is required, is perhaps the most critical intervention for making motherhood safer.

– SAFE MOTHERHOOD TECHNICAL CONSULTATION, COLOMBO, SRI LANKA 1997

Every minute a woman dies in childbirth or from complications of pregnancy. That adds up to some 529,000 women lost each year, almost all in developing countries. For every woman who dies as many as 30 others suffer chronic illness or disability such as obstetric fistula.

The death or disability of a mother can plunge poor families deeper into poverty and despair. Surviving children are put at risk. The loss may reverberate throughout an entire community.

The tragedy of all this death and disability is that it can be avoided. Most maternal deaths are caused by haemorrhage, obstructed labour, infection, eclampsia, and complications from unsafe abortion. However, a growing proportion of deaths are attributed to indirect, non-obstetric conditions such as infectious disease (HIV/AIDS, malaria, tuberculosis and hepatitis), chronic diseases (of the heart, lung and liver), gender-based violence and the multiple problems faced by pregnant women in emergency situations. While the obstetric complications of pregnancy and delivery are not all predictable or preventable, they are all treatable.

We know that efficient emergency interventions for complications are key to saving women's lives. In industrialized countries, where women can count on skilled attendance and emergency obstetric care at delivery, maternal death is rare. In most developing countries, however, high

maternal mortality reflects failing health systems as well as a lack of social and political commitment to the issue.

Working for the survival and well-being of mothers is a moral and human rights imperative, one that also has enormous implications in terms of social and economic progress. For these reasons, the subject has gained wider attention and priority in recent years, especially since the Safe Motherhood Initiative was launched in Nairobi, Kenya in 1987.¹ The call for a reduction in maternal mortality was echoed at all international conferences throughout the 1990s, and is a pillar of the Partnership for Safe Motherhood and Newborn Health, established in 2004.

The International Conference on Population and Development (1994), the Fourth World Conference on Women in Beijing (1995) and the Millennium Development Goals (2000) all recognize safe motherhood as an essential part of development. These development frameworks call for a 75 per cent reduction of 1990 maternal mortality ratios by 2015, and for 90 per cent of all births to be assisted by a skilled attendant within the same time frame. They also acknowledge the burden that death and disability place on poor populations.

¹ FCI, FIGO, ICM, IPPF, the Population Council, RPM, UNICEF, UNFPA, WHO and the World Bank partnered on the launch.

Learning from the past

The tenth anniversary of ICPD offers an opportunity to reflect on the limited progress made in reducing maternal mortality and to promote a shift in emphasis in many national safe motherhood programmes. This shift, which has significant implications for policy and resources, will be required if the international goals for 2015 are to be met.

Although notable progress has occurred in some countries, an unacceptable number of women, especially in Africa and Asia, continue to die in childbirth. Despite many efforts to improve the situation, progress is uneven and, in some countries, backsliding. This stalled progress has many causes: National commitment has been lacking in some countries, and women's needs still are not high on the list of priorities in many communities. The power of women to choose the obstetric care they want is often limited. The HIV/AIDS epidemic has made matters worse by complicating pregnancy outcomes, straining public health budgets, reducing the number of trained providers and overwhelming health-care systems. Poverty, conflicts, natural disasters and other emergencies have further exacerbated the situation in many countries.

Moreover, some earlier strategies to address maternal mortality have proven to be ineffective. Interventions to train traditional birth attendants (TBAs) have had limited success in reducing maternal mortality because TBAs lack the medical skills needed to manage obstetric complications and are not usually part of the formal health-care system.

Focusing on early detection of high-risk pregnancies has also proven to be an ineffective strategy. The problem with a risk-based approach is that in reality all pregnant women face risks. An estimated 15 per cent of births are complicated by a potentially fatal condition that may appear with no warning. It is often difficult to deter-

mine which women will develop complications. However, while many obstetric complications are neither predictable nor preventable, almost all of the serious complications of childbearing are treatable. This is why skilled attendance at delivery is so important – it ensures that women have prompt access to emergency obstetric care when the need arises.

UNFPA's strategic and rights-based approach

UNFPA's three-pronged strategy to reduce maternal mortality calls for:

- Universal access to contraceptive services to reduce unintended pregnancies;
- Skilled attendance at all births; and
- Emergency obstetric care for all those women who develop complications.

The last two parts of the strategy address the care women receive at the time of delivery and are the focus of this report. If all pregnant women have access to skilled attendance, then those who develop complications are more likely to get timely obstetric care. Readiness is key.

Since almost all maternal mortality is avoidable, UNFPA considers the death of a woman during pregnancy or childbirth a violation of her right to life and health as well as a social injustice. For this reason, UNFPA's approach to reducing maternal mortality is grounded in human rights and gender equality and equity principles. Recognizing the role of gender in influencing access to and quality of health care, a rights-based approach promotes the empowerment of women and supports conditions in which they can choose safe delivery. A rights-based approach also guides the design and implementation of UNFPA's maternal mortality policy and programming. Applied in a culturally sensitive manner, human rights principles can promote dignity and social justice for clients and providers at the levels of clinical operations, facility

management and national policy. A human-rights approach strives for equality and equity not just in “what” we do to reduce maternal mortality, but also in “how” we do it.²

Trends in maternal mortality worldwide

Some 529,000 women died from complications of childbirth and pregnancy in 2000, according to recent estimates.³ These deaths were almost equally divided between Africa and Asia, which together accounted for 95 per cent of the total. Only 4 per cent (22,000) of all maternal deaths occurred in Latin America and the Caribbean, and less than 1 per cent (2,500) in the more developed regions of the world. Because of large margins of uncertainty, the number of maternal deaths could fall within the range of 277,000 to 817,000. Thus, although these figures show a slight increase from 515,000 in 1995, this should not be taken as indicative of a trend. However, the numbers do emphasize the need to address the issues contributing to maternal mortality.

The maternal mortality ratio, which measures the obstetric risk associated with each pregnancy, was estimated to be 400 per 100,000 live births globally in 2000. Maternal mortality ratio estimates are highest in Africa (830), followed by Asia (330), Oceania (240), Latin America and the Caribbean (190), and the developed countries (20). But these estimates cannot realistically be used to analyse trends for statistical reasons because of insufficient sample sizes, large confidence intervals and changes in methods of measurement.

The disparities in the obstetric risks women face over a lifetime are extreme. In sub-Saharan Africa, the cumulative lifetime risk of maternal death may be as high as 1 in 16, compared to 1 in 2800 in developed countries.

Adolescents face particularly high risks. Pregnancy is the leading cause of death for young women aged 15 to 19 worldwide with complications of childbirth and unsafe abortion



being the major factors. For both physiological and social reasons, girls aged 15 to 19 are twice as likely to die in childbirth as those in their twenties. Girls under 15 are five times as likely to die as those in their twenties.

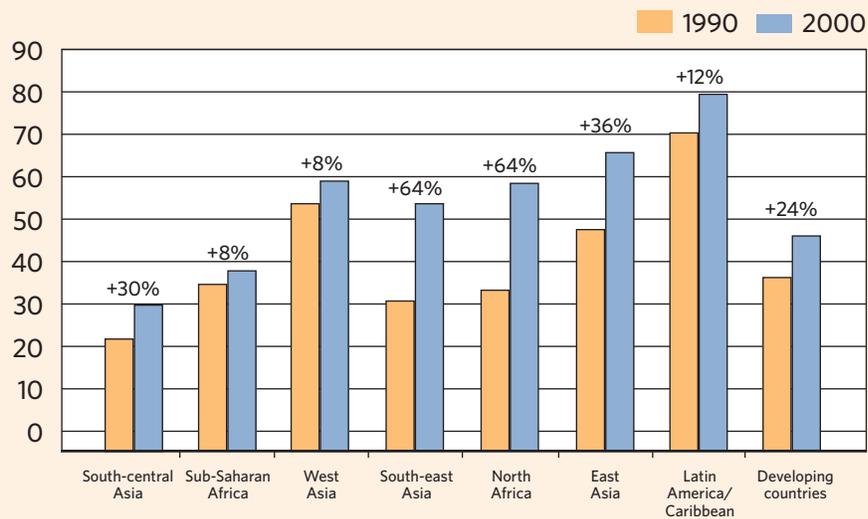
Trends in deliveries with a skilled attendant (doctor, nurse or midwife)

In the developing world, the percentage of births with skilled attendants increased significantly between 1990 and 2000, from 42 to 52 per cent. This represents a 24 per cent increase in the developing world as a whole. The greatest improvements occurred in South-east Asia and North Africa, with nearly a 40 per cent increase in both regions. However, a closer look at this trend reveals that the magnitude of change between 1990 and 2000 is small in the critical regions of sub-Saharan Africa and West Asia, areas with large populations and high rates of maternal death (see Figure 1). Within these regions, significant differences can be found among countries and the various settings within

2 Freedman L (2001). Using Human Rights in Maternal Mortality Programs: From Analysis to Strategy. *International Journal of Gynecology and Obstetrics* 75:51-60.

3 WHO (2004). *Maternal Mortality in 2000: Estimates Developed by WHO, UNICEF, and UNFPA*. Geneva: WHO.

FIGURE 1 - CHANGES IN PERCENTAGE OF DELIVERIES WITH A SKILLED ATTENDANT, 1990-2000



Based on 61 countries with trend data covering 75 per cent of developing country births

SOURCE: DHS - MACRO INTERNATIONAL

management and national policy. A human-rights approach strives for equality and equity not just in “what” we do to reduce maternal mortality, but also in “how” we do it.²

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4 Graham WJ and Hussein J (2003). Measuring and Estimating Maternal Mortality in the Era of HIV/AIDS. UN/POP/MORT/2003/8. New York: United Nations Population Division.

THE SKILLED ATTENDANT INDICATOR

The percentage of births with a skilled attendant was widely accepted at the Millennium Summit as one of the key indicators for assessing progress in reducing maternal deaths. The use of such indicators is important because maternal mortality rates and ratios are extremely difficult to measure directly in settings where the problem is most acute. In those countries, estimates of maternal mortality often have wide margins of error and are too uncertain to reveal short-term trends. Process indicators, such as the percentage of births attended by a skilled health worker, are more sensitive in this regard. Data on this indicator is widely available through Demographic and Health Surveys conducted every five years in 142 countries. However, the apparent simplicity of this indicator belies conceptual and technical issues that may complicate accurate reporting of the proportion of births with a skilled attendant.

The term “skilled attendant” is just a snapshot of the complex reality of delivery care. It may not adequately capture the extent to which women can actually access appropriate care, particularly when complications arise. One of the major challenges in measuring and interpreting the indicator is determining who is counted as a skilled attendant. Often, the people who respond to the health surveys do not always know the credentials of their birth attendants. In settings where there is no

specific cadre of workers assigned to provide health care during pregnancy and childbirth, it is particularly problematic to accurately report on this indicator. Although efforts have been made to standardize the definitions of doctors, nurses, midwives and auxiliary midwives used in most household surveys, many attendants who are described as “skilled” would probably not meet the internationally accepted criteria (see page 19).¹

The importance of a functioning health system has been identified as a key intervention for reducing maternal mortality. Yet, the skilled attendant indicator does not indicate if deliveries occur in an enabling environment where emergency obstetric care is readily available. In addition, this indicator, derived from national survey data, can mask disparities in access to care among regions and socio-economic and ethnic groups.²

An important part of improving skilled attendance includes refining the methods used for monitoring and evaluating progress. Additional research must be conducted to identify gaps in calculating and interpreting the skilled attendant indicator and to develop more accurate mechanisms for measuring the data.

1 WHO (2004). Making Pregnancy Safer: The Critical Role of the Skilled Attendant. A Joint Statement by WHO, ICM and FIGO. WHO: Geneva.

2 Abou Zahr C and Wardlaw T (2001). Maternal Mortality at the end of a decade: signs of progress? Bulletin of the World Health Organization 79(6). WHO: Geneva.

Pregnancy is the leading cause of death for young women aged 15 to 19 worldwide with complications of childbirth and unsafe abortion being the major factors. For both physiological and social reasons, girls aged 15 to 19 are twice

as likely to die in childbirth as those in their twenties. Girls under 15 are five times as likely to die as those in their twenties.

Trends in deliveries with a skilled

why we focus on skilled attendance

A focus on skilled attendance at birth makes sense for a number of reasons. Most maternal deaths occur close to the time of delivery, underscoring the need for timely interventions. The major causes of maternal death require medical interventions: Severe bleeding, infection and eclampsia can often be managed by a skilled professional in a health facility, while Caesarean sections to resolve obstructed labour and safe blood transfusions require more fully equipped hospital facilities. Historical and epidemiological data provide additional evidence to support the emphasis on skilled attendance. Moreover, providing skilled care at birth can also reduce infant mortality.

Historical evidence

Countries that have succeeded in reducing maternal mortality have emphasized the role of the pro-

fessional midwife or doctor working in health facilities, usually hospitals. Over the last five or six decades, maternal death decreased in Malaysia and Sri Lanka in response to improved access to health care in rural areas and the introduction of professional midwifery. More recently, China, Costa Rica, Egypt, Indonesia, Jamaica, Jordan, Mexico and Thailand have reduced maternal mortality by increasing the availability of skilled attendants and improving the referral system for emergencies.

In China, the expansion of government services offering professional medical care to rural areas between the 1960s and 1980s contributed to a dramatic reduction in maternal deaths. Similarly, in Malaysia, the health-care system's improvements in rural areas resulted in skilled, salaried midwives at more births. Since the 1980s, Malaysia's

PARTNERSHIP FOR SAFE MOTHERHOOD AND NEWBORN HEALTH

Each year, more than 7 million infants die before reaching their first birthday. Since the launching of the Safe Motherhood Initiative in 1987, much has been learned about the linkages between maternal and newborn health. However, many women and their newborns continue to suffer and die needlessly. In January 2004, the Partnership for Safe Motherhood and Newborn Health was established to expand the global initiative to promote the health and survival of women and newborns in the developing world. Guided by the broader goals of poverty reduction, equity and human rights, the Partnership will address the enormous health disparities between urban and rural populations and the rich and poor. The potential to meet the Millennium Development Goals lies in the coalition's ability to coordinate the efforts of NGOs, research institutions, governments, donors and global organizations. The Partnership brings together NGOs, who often articulate the demand for services, provide services, and advocate among politicians, and with governments, who are responsible for ensuring availability of services. Under the Partnership, research institutions will benefit from close interaction among partners in the documentation and dissemination of lessons learned. Donors, funds and global and regional organizations are linked to maximize resource mobilization and coordinate efforts. All organizations active in safe motherhood and/or newborn health can apply for membership in the Partnership. For more information, please visit the Safe Motherhood website at: www.safemotherhood.org

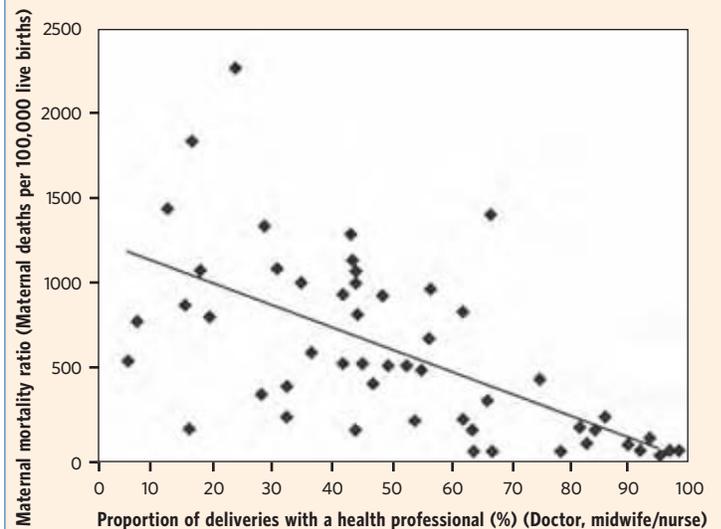
highly supervised referral system, along with free transportation, has shifted the preponderance of births to health institutions and significantly reduced maternal mortality. In Sri Lanka, midwives were deployed throughout the country and health-care services were expanded in rural communities in the early decades of the twentieth century. By 1996, over 94 per cent of births took place in hospitals.⁵ Cuba, Egypt, Jamaica and Thailand also reduced maternal mortality following coordinated transitions from home-based to facility-based delivery, offering skilled care at birth as well as the capability to perform Caesarean sections and blood transfusions.

Epidemiological evidence

The inverse relationship between maternal mortality and the proportion of deliveries attended by health professionals provides further indication of the importance of skilled attendants (Figure 2). In general, the higher the proportion of deliveries by a health professional, the lower the maternal mortality ratio. In almost all countries where health professionals attend more than 80 per cent of deliveries, maternal mortality ratios are below 200 per 100,000.

Although the relationship in Figure 2 appears strong, we must be cautious in our interpretation of these data for a number of reasons. First, a strong correlation in the data does not imply that increasing the proportion of births with skilled attendants causes reductions in maternal mortality. Other, difficult-to-measure factors may be impacting both indicators. Second, the reliability of data for both indicators is questionable. The difficulty in estimating maternal mortality is well known. In addition, problems in survey data collection and interpretation complicate reporting on the proportion of births with skilled attendants.⁶

FIGURE 2: THE RELATIONSHIP BETWEEN MATERNAL MORTALITY AND PERCENTAGE OF DELIVERIES WITH A HEALTH PROFESSIONAL FOR 57 DEVELOPING COUNTRIES, 1995



SOURCE: University of Aberdeen

Healthier newborns

Providing skilled care at birth goes hand in hand with the Millennium Development Goal to reduce child mortality, which is strongly influenced by disproportionate rates of neonatal mortality. Nearly 3.4 million of the 8 million infant deaths each year occur within the first week of life and are often due to a lack of or inappropriate care during pregnancy, delivery and the post-partum period. Skilled attendants are trained to provide appropriate care for both mothers and babies during normal and complicated deliveries. The obstetric complications most likely to affect the foetus are obstructed or prolonged labour, eclampsia, ante-partum haemorrhage and infection. A skilled attendant operating in an enabling environment, which includes support, supervision and equipment with regard to newborn care, can manage all of these complications.

5 Koblinsky MA, Campbell O and Heichelhem J (1999). Organizing Delivery Care: What Works for Safe Motherhood? *Bulletin of the World Health Organization* 77 (5): 399-406.
6 Family Care International (2002). *Skilled Care During Childbirth: Information Booklet*. New York: FCI.

women. Moreover, traditional birth attendants can be influential in the demand for and referral to more formal delivery care services.

Enabling environment: The outer oval represents the health system. This includes regulatory frameworks and policies that promote safe motherhood and support effective interventions. It also includes clinical standards and protocols that define quality maternal and newborn care. Professional associations often play an important role in the enabling environment by advising governments on the development of safe motherhood legislation, standards and protocols. Adequate equipment and supplies, and reliable systems of referral, transportation and communication are crucial components of an enabling environment. Roads, public transportation and utilities such as water, electricity and telecommunications are infrastructural elements of the environment that health systems typically rely on governments to provide. Adequate human resources and management systems that ensure opportunities for continu-

ing education and appropriate deployment and supervision of skilled attendants are additional components. An enabling environment can also encompass the community in which the birth occurs, including local traditions and attitudes.

Health professionals: The inner oval represents the health professionals who provide care at delivery. In addition to clinical knowledge and skills of the attendant, the larger environment can determine her or his effectiveness.

Referral: The innermost overlapping circles represent the different levels of service provision. Referral between these levels is represented by the arrow. It indicates the desired movement from delivery care for normal labour at the primary level to basic and comprehensive emergency obstetric care for women with obstetric complications who need higher levels of care (see box below). In addition to referral between facilities, referral from the community to a health facility is key.

WHAT IS EMERGENCY OBSTETRIC CARE (EmOC)?

Basic Emergency Obstetric Care

A skilled attendant should be able and equipped to perform the following functions at delivery:

- Inject antibiotics;
- Inject oxytocics to induce uterine contractions;
- Inject anticonvulsants;
- Remove entire placenta or parts of it manually;
- Assist vaginal delivery by vacuum extraction.

The sixth function that is considered part of basic emergency obstetric care, removal of retained products from the uterus, does not occur at the time of delivery. Basic emergency obstetric care should be performed in a health centre, but does not require an operating theatre.

Comprehensive Emergency Obstetric Care

The attendant should also be able to refer severe cases to a higher level of care in case the following functions are required, and to manage the patient during transport. Comprehensive emergency obstetric care includes the 6 basic functions listed above plus:

- Caesarean section;
- Safe blood transfusion.

Comprehensive emergency obstetric care requires an operating theatre and is usually performed in district hospitals.

THE SAFE STUDY

SAFE was an operational research study conducted between September 2000 and February 2003 and coordinated by the University of Aberdeen. In collaboration with five countries – Bangladesh, Ghana, Jamaica, Malawi and Mexico, SAFE aimed to provide new knowledge on the identification, implementation and evaluation of effective, affordable and equitable strategies to increase skilled attendance at delivery in developing countries.

Research was conducted on how data could be collected in new ways to measure and describe skilled attendance. The findings of the research are outlined in this publication. The findings from the SAFE study are also used to develop strategies for improving skilled attendance and these are described in the accompanying booklet, "Into Good Hands: Progress Reports from the Field."

women. Moreover, traditional birth attendants can be influential in the demand for and referral to more formal delivery care services.

Enabling environment: The outer oval represents the health system. This includes regulatory frameworks and policies that promote safe motherhood and support effective interventions. It also includes clinical standards and protocols that define quality maternal and newborn care. Professional associations often play an important role in the enabling environment by advising governments on the development of safe motherhood legislation, standards and protocols. Adequate equipment and supplies, and reliable systems of referral, transportation and communication are crucial components of an

enabling environment. Roads, public transportation and utilities such as water, electricity and telecommunications are infrastructural elements of the environment that health systems typically rely on governments to provide. Adequate human resources and management systems that ensure opportunities for continuing education and appropriate deployment and supervision of skilled attendants are additional components. An enabling environment can also encompass the community in which the birth occurs, including local traditions and attitudes.

Health professionals: The inner oval represents the health professionals who provide care at delivery. In addition to clinical knowledge and skills of the attendant, the larger environment can determine her or his effectiveness.

Referral: The innermost overlapping circles represent the different levels of service provision. Referral between these levels is represented by the arrow. It indicates the desired movement from delivery care for normal labour at the primary level to basic and comprehensive emergency obstetric care for women with obstetric complications who need higher levels of care (see box below). In addition to referral between facilities, referral from the community to a health facility is key.

8 Bell J, Curtis SL and Alayon S (2003). Trends in delivery care in six countries. DHS Analytical Studies No.7. Calverton, Maryland: Operational Research Corporation (ORC) Macro and International Research Partnership for Skilled Attendance for Everyone (SAFE).

Factors that influence the care a pregnant woman receives

A woman's location, socio-economic status and education all may affect the adequacy of the care she receives during her delivery. Cultural and religious beliefs often influence where a woman chooses to give birth. Her own decision-making power within the family, and her past experiences in childbearing, may affect the care she receives as well.

The importance of these factors may differ from setting to setting, but a recent study⁸ of trends across six developing countries – Bangladesh, Bolivia, Ghana, Indonesia, Malawi and the Philippines – found these correlations:

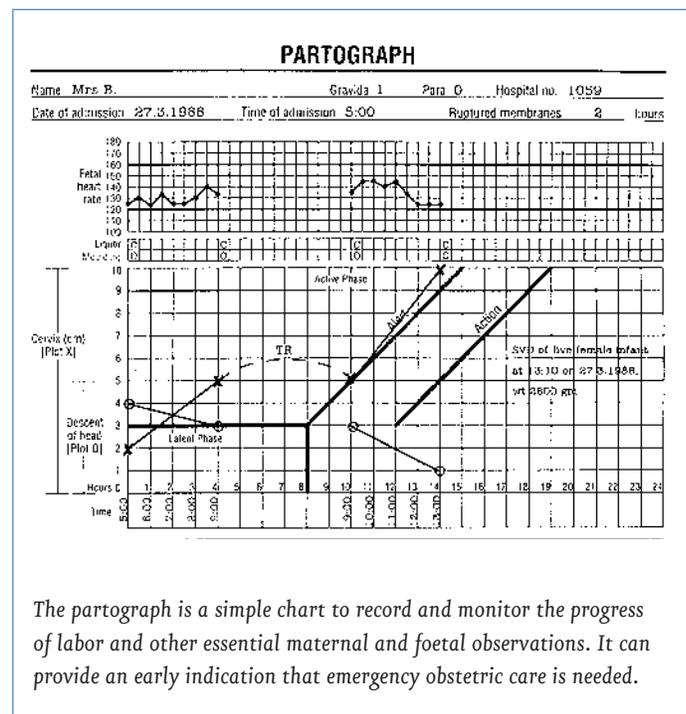
- **Urban-rural residence** – The percentage of women receiving professional delivery care is consistently higher in urban than in rural areas.
- **Poverty** – The richest women are most likely to receive skilled care at delivery. The poorest women are least likely to receive care.
- **Maternal education** – The more education a woman has received the more likely she is to deliver with a professional.
- **Antenatal care** – The more antenatal visits she makes, the more likely a pregnant woman is to receive professional delivery care.
- **Birth order** – The higher the birth order of a delivery, the less likely the mother is to receive professional delivery care. In other words, women in their first or second pregnancy are more likely to deliver with a skilled birth attendant than women who have already had several children.

The study also found that delivery with health professionals has increased over the last decade in all six countries, with the largest increases in

Bolivia and Indonesia and the smallest in Malawi. However, while rates of professional delivery care appear to be increasing in some countries, national trends provided by large-scale surveys can mask substantial variations among different groups of women, especially the inequities between rich and poor (see Figure 4).

Measuring skilled attendance

To improve the means by which the many components of skilled attendance could be measured, a SAFE study in Ghana developed an approach to measuring the delivery care provided in health facilities. Using this method, the frequency of actions – such as completing a partograph and recording haemoglobin count, onset of labour, blood loss, mother and baby's condition at delivery and discharge – can be quantified. This provides valuable clinical information on the areas of skilled attendance that are deficient. The study also used these individual frequencies of clinical actions to provide a summary measure of skilled attendance as one composite indicator called the Skilled Attendance Index.⁹ By collating



9 Hussein J, Bell J, Nazzar A, Abbey M, Adjei S and Graham WJ (2004). The Skilled Attendance Index (SAI): Proposal for a new measure of skilled attendance at delivery. *Reproductive Health Matters* 12 (24): 160-170.

10 Starrs, A., from Family Care International in collaboration with the Inter-Agency Group for Safe Motherhood (1997). *The Safe Motherhood Action Agenda: Priorities for the Next Decade*. New York: FCI.

the frequencies and types of clinical actions conducted, the Index provides a measure of the health professionals' practice as well as of the environment within which they function. The Skilled Attendance Index can be used to compare the delivery care being provided in different facilities or among different types of delivery.

Who is a skilled attendant?

The term "skilled attendant" refers exclusively to people with midwifery skills (for example, doctors, midwives, nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose, manage, or refer obstetric complications. They must be able to recognize the onset of complications, perform essential interventions, start treatment, and supervise the referral of mother and baby for interventions that are beyond their competence or not possible in the particular setting.

- WHO (1999). REDUCTION OF MATERNAL MORTALITY: A JOINT WHO/UNFPA/UNICEF STATEMENT. GENEVA: WHO.

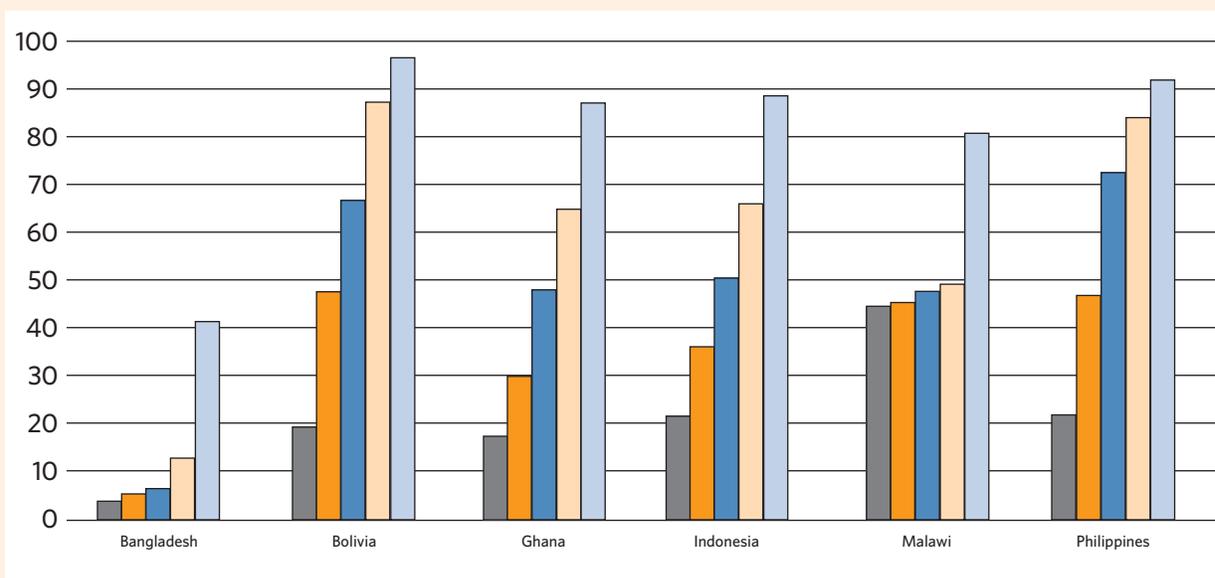
This competency-based definition of a skilled attendant clearly distinguishes between providers who are skilled and those who are simply trained. "Trained" implies but does not guarantee the acquisition of knowledge and competence with regard to midwifery skills. In contrast, a truly "skilled" provider not only has midwifery skills, but also maintains proficiency in using these skills.¹⁰ Trained or not, inadequately skilled community health workers and traditional birth attendants do not fall under the accepted definition of a skilled attendant (although they well may be designated as "skilled attendants" in the Demographic and Health Surveys that collect the data for this indicator).

In developed countries and in many urban

11 Hussein J, Abbey M, Adjei S, Quansah G and Graham WJ (2002). How do women identify their health professional? Improving the measurement of skilled attendance at delivery. Presented at the International Confederation of Midwives Conference, April 2002, Vienna.

12 WHO (2004). Making Pregnancy Safer: The Critical Role of the Skilled Attendant. A Joint Statement by WHO, ICM and FIGO. Geneva: WHO.

FIGURE 4: PERCENTAGE DELIVERIES WITH HEALTH PROFESSIONALS IN SIX COUNTRIES, SHOWING INEQUITIES BETWEEN THE RICHER AND POORER (DIVIDED BY QUINTILES)



SOURCE: SAFE, University of Aberdeen

■ poorest ■ second ■ third ■ fourth ■ fifth

areas in developing countries, skilled care at delivery is usually provided in a health facility. However, birth can take place in a range of appropriate places, from the home to a referral centre, depending on availability and need. The home may be appropriate for a normal delivery if the person attending the delivery is suitably skilled and *if* referral to a higher level of care is possible and optimally organized.

Ideally, skilled attendants live in, and are part of, the community they serve. They must be able to perform the whole range of the continuum of obstetric care before, during and after delivery for normal births. This includes preventive functions before birth during antenatal care as well as clean birth practices, use of the partograph, active management of the third stage of delivery, care of the newborn, early detection of signs of complications for both mother and newborn, and referral to the next level of care in the case of obstetric emergency.

Women's perceptions

Accurate identification of skilled attendants can be complicated by different perceptions on the part of clients. Women who deliver in a health facility may not know or be able to accurately report the qualification of their providers. Research carried out by SAFE in Ghana identified ways in which women determined who conducted their delivery.¹¹ Women reported that the uniform worn, the attendant's role or behaviour and the existing knowledge were the ways in which the health professional was identified. Although rural women indicated that a health worker's designation was common knowledge in the village, few urban women cited this method of identifying their delivery attendant.

Many women reported that more than one person assisted in their delivery. However, commonly used data sources for delivery attendants focus only on one health worker. Demographic

and Health Surveys do allow recording of all persons assisting, but analysis is typically focused on the most qualified attendant. Different individuals who assist during labour and delivery can influence quality of delivery care. Identification of the most qualified attendant, therefore, is unlikely to provide a complete picture of the event.

Types of skilled attendants and the mix of skills and abilities¹²

While it is up to each country to decide on how maternity care is organized, much depends on the availability of skilled attendants, their skills and abilities and the resources available to recruit, train and retain staff. The principal categories of professional birth attendants include:

Midwives: Persons who, having been regularly admitted to an educational programme duly recognized in the country in which it is located, have successfully completed the prescribed course of studies in midwifery and acquired the requisite qualifications to be registered and/or legally licensed to practise midwifery.

Nurses with midwifery skills: Nurses who have acquired midwifery knowledge and skills either as a result of midwifery being part of their nursing curricula or through special post-basic training in midwifery.

Doctors with midwifery skills: Medical doctors who have acquired competency in midwifery skills through specialist education and training, either during their pre-service education or as part of a post-basic programme of studies.

Obstetricians, as specialists in obstetric care, play a role in the training, technical support, supervision and delegation of clinical tasks. They should be included in the data on percent-

¹³ Scotland G and Bullough CHW (2004) What do doctors think their caseload should be to maintain their skills for delivery care? *International Journal of Gynecology and Obstetrics* 87: 301-307.

age of births attended by a skilled attendant.

The importance of the attendant's caseload

Professional labels do not always capture the range of competencies a skilled attendant is capable of performing. The core skills and abilities of a skilled attendant have been defined by the International Confederation of Midwives. However, a caseload that allows doctors, nurses and midwives to maintain their skills but does not overload them is also critical. Through consultation with obstetricians from a diverse range

of countries in Africa and Asia, SAFE has developed a method to foster consensus on what the minimum, maximum and optimum caseload should be for a variety of obstetric procedures.¹³ These can be used to inform the organization of maternity services and to help doctors and midwives maintain their skills.

The role of the traditional birth attendant

The term traditional birth attendant, or TBA, refers to community-based providers of care during pregnancy, childbirth and the post-natal period who operate independently of the health



the way forward

Maternal mortality reduction depends on a facility-based health system that works. The death of a woman from childbirth is the ultimate failure of the health system. This failure, repeated once a minute in the developing world, represents irrevocable loss and a violation of women's right to life.

The Millennium Development Goals underscore the importance of skilled care at birth as a means to reduce maternal mortality and morbidity. Although considerable evidence supports this strategy, findings from different countries demonstrate that there is still much to learn and understand about how to effectively implement and evaluate it. Providing skilled attendance requires attention not just to health professionals, but also to the overall functioning of health systems. It is a complex task.

Skilled attendance during childbirth demands a continuum of care requiring a range of skills and capacities. The quality of and access to care can vary widely, sometimes even within a single health district. Thus, strategies to improve access to and quality of care need to be tailored to the specific context, as the project examples in the companion booklet clearly illustrate. Urban areas can often offer a higher quality of care than rural communities, mainly due to proximity and accessibility of facilities and modern communication systems. Inadequate resources, difficult terrain and high HIV prevalence are complicating factors in many areas. In areas affected by political conflict or natural disasters, health systems are often weakened or destroyed, and access to and quality of skilled attendance is diminished. Sometimes traditional practices or cultural beliefs present barriers to obstetric care that require great sensitivity and patience to overcome.¹⁴

Investing in human resources

For almost all developing countries, human resource strategies are pivotal in improving skilled birth attendance. Attrition, migration, poor pay and HIV/AIDS have left many countries with inadequate numbers of health professionals. In some, macroeconomic policies have adversely affected the health workforce.

Skilled midwives are central to efforts to improve pregnancy outcomes. Almost all developing countries that have significantly reduced maternal mortality have emphasized the role of the skilled midwife working in health facilities, usually hospitals. However, only about half of developing countries have schools dedicated to training midwives.

Human resource strategies also need to address the effect of "brain drain." A majority of health professionals trained within certain developing countries are now working abroad. Negotiations to address this loss of precious human capital will require involvement of countries from both North and South.

In addition, strategies must ensure that all birth attendants receive the training and orientation they need to provide youth-friendly services. Limited access to reproductive health services leaves adolescents particularly vulnerable to unintended pregnancy. Adolescents disproportionately resort to unsafe abortion due to the high cost and limited availability of quality abortion services. This leaves them particularly at risk of maternal death.

Sound human resource and management strategies should also ensure that pay scales, working conditions and career advancement opportunities are sufficient to maintain the equitable distribution of workers across regions, boost morale and reduce attrition. Mechanisms to maintain and upgrade providers' clinical skills

¹⁴ UNFPA (2004). *Working from Within: Culturally Sensitive Approaches in UNFPA Programming*. New York: UNFPA.

and abilities are needed. Strategies should also be put in place to clarify the appropriate delegation of authority to skilled attendants when physicians are unavailable to perform technical functions (such as administration of anaesthesia, vacuum extraction and Caesarean sections).

Addressing HIV/AIDS and malaria

In the era of HIV/AIDS, significant resources, political will and commitment are needed to confront both the health and human resource impacts of the disease on maternal mortality in high prevalence areas. Birth attendants need training to address HIV-related complications that can affect pregnancy outcomes for both mother and child. They also need support in taking precautions necessary to avoid contamination from infected blood.

Reproductive health programmes represent an essential entry point for addressing the triple conjunction of HIV/AIDS, malaria and pregnancy. Family planning clinics, treatment centres for sexually transmitted infections and antenatal facilities can each play an important role in delivering malaria education and promoting voluntary counselling and testing. Women who are HIV-negative or whose status is unknown should have access to prevention counselling and voluntary counselling and testing services. For women who are HIV-positive, treatment as well as support and counselling regarding safer infant feeding and living with HIV should be available.¹⁵

Efforts to address HIV/AIDS need not be limited to maternal health services. Clinics for family planning and management of sexually transmitted infections also intersect with HIV/AIDS. The services, technologies and information associated with these programmes represent a critical entry point for addressing HIV/AIDS. UNFPA has been active not only in fostering a global discussion on the relationship between reproductive health and HIV/AIDS, but also in providing policy mak-

ers and programmers with the resources required to integrate HIV/AIDS into existing reproductive health interventions.¹⁶

Upgrading health institutions

Upgrading health institutions is a critical strategy for improving delivery care. As medical facilities and referral systems begin to offer a higher quality of care, communities will take note of and build demand for services. In addition to addressing the human resource issues noted above, institutional improvements may include physical renovation, more support staff, implementation of standards of practice, improved management and supervision, and the purchase, distribution and maintenance of equipment. Securing equipment and supplies for maternal health care is part of UNFPA's reproductive health commodity security initiative.

Attention should also be given to building rapport between women and health providers. In some settings, women may be reluctant to deliver in facilities because of negative attitudes among professional health workers. Maternal care centres and hospitals need to be welcoming in every sense of the word. Cultural sensitivity must be integrated into all operational levels – clinical, managerial, and monitoring and evaluation – to ensure that all women are treated with dignity and respect. This is particularly relevant for facilities that serve indigenous populations. Health professionals may require sensitization to the cultural norms surrounding delivery. Social practices that do not compromise skilled attendance – such as the presence of a trusted person during delivery, vertical delivery or walking around during labour – should be considered.

15 Engenderhealth and UNFPA (2004). HIV Prevention in Maternal Health Services: Programming Guide. New York: Engenderhealth.

16 Population Council and UNFPA (2002). HIV/AIDS Prevention Guidance for Reproductive Health Professionals in Developing Country Settings. New York: Population Council and UNFPA.

OBSTETRIC FISTULA AND INADEQUATE DELIVERY CARE

The most devastating of all maternal morbidity, obstetric fistula affects an estimated 50,000 to 100,000 women each year. It usually occurs when a young, poor woman experiences obstructed labour and cannot get a Caesarean section when needed. Obstetric fistula is a hole between the bladder and the vagina, or the rectum and the vagina, which leaves a woman incontinent. As a result, many women with fistula are divorced or abandoned and forced to live in isolation. Completely preventable and usually treatable, obstetric fistula stems from a number of socio-cultural and economic factors that predispose young women to early marriage and childbearing. These factors also limit women's access to quality maternal health services, including skilled care at birth and emergency obstetric care for complications.

In-depth discussions with survivors of this extreme maternal morbidity – called “near miss” audits – are extremely valuable in assessing the numerous obstacles women face in accessing skilled care. Country-level assessments conducted for UNFPA's Campaign to End Fistula revealed a host of socio-cultural, geographic and economic barriers that hinder women's access to skilled care before and during delivery and in the immediate post-partum period.

In Kenya, delays in deciding to seek skilled care were prevalent in all study districts. Women often try to deliver at home with traditional birth attendants for up to three days. Once a decision is made to seek facility-based care, long distances – up to 60 kilometres – and a lack of motorized transport can increase the delay for another 24 hours.¹ In Eritrea, tradition dictates that the first child should be born at the grandparents' home even when a health facility is nearby and accessible. Nearly 39 per cent of the study population delivered at home assisted by a traditional birth attendant. In Eritrea, it is also widely understood that traditional birth attendants delay referrals until they have exhausted all of their own solutions.²

For those women with complications who did reach a health facility, critical gaps in provider skills, medical equipment, drugs and supplies often resulted in obstetric fistula. For example, in Eritrea, a 20-year-old fistula patient from the Tigrinya ethnic group had a normal pregnancy and frequent prenatal care. She recalled, “Even the delivery went normally, but there was a nurse, who was just in training, and after my baby was born, he pulled the placenta out by force.... When he pulled, another nurse shouted at him: ‘Don't do that!’ I was torn badly down there, so they had to stitch it all up, but everything got so infected, and that infection never seems to have gone away.”³

For more information on UNFPA's Campaign to End Fistula, please visit: www.endfistula.org

¹ Kenya Ministry of Health and UNFPA (2004). Needs Assessment of Obstetric Fistula in Selected Districts of Kenya. Final Report. Government of Kenya, p. 22.

² (Eritrea Ministry of Health and UNFPA (2003). National Fistula Needs Assessment. Asmara, Eritrea: Government of Eritrea, p. 39.

³ Campbell-Krijgh E, Campbell B, and Abraha T (2003). Mending Torn Lives: A series of open conversations with women suffering from obstetric fistula in Eritrea. UNFPA and the Eritrea Ministry of Health, p. 9.

Building a stronger base of evidence

Clearly, improving access to skilled attendance at birth is essential to achieving the Millennium Development Goal of reducing maternal mortality by 75 per cent by 2015. However, a stronger base of evidence is needed to promote and refine strategies to improve delivery care. Measuring the impact of skilled attendance is not straightforward, and will require innovation, re-visiting and re-evaluating what we already think we know. This strategy must also address the refinement of data collection systems for the proportion of births with skilled attendants. To be successful, we will need united and concerted partnerships among the many groups committed to safe motherhood. With this in mind, a new global research programme for safe motherhood, IMMPACT (*Initiative for Maternal Mortality Programme Assessment* at: www.abdn.ac.uk/immpact) was launched in September 2002 by the University of Aberdeen. IMMPACT will develop enhanced methods and capacities for robust evaluation of safe motherhood strategies, including skilled attendance at delivery, as a way to improve the evidence base for decision-making in the poorest countries.

Saving women's lives, investing in the future

Each of the above-mentioned health reforms will require significant and sustained increases in health-sector expenditures. In many countries, these expenditures are being negotiated in accordance with sector-wide approaches (SWAps), poverty reduction strategy papers (PRSPs), budget support and programme-based approaches. Regardless of the approach, these expenditures, which are in any case modest when divided among the many who would benefit from them, are properly viewed as investments. They are investments in women who are the backbones of families, educators of children, caretakers of young and old, breadwinners and entrepreneurs. Half a million women lose their lives every year from preventable pregnancy-related causes. Fifteen million more live to suffer the consequences of short-and long-term morbidity arising from neglected pregnancy and labour. At the start of the twenty-first century, we must do everything we can to overcome this daily tragedy and injustice.



for further information

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websites

AMDD: <http://cpmcnet.columbia.edu/dept/sph/popfam/amdd/> or www.amdd.hs.columbia.edu

Family Care International: www.familycareintl.org/work/global_programs.html#s1

IMMPACT: www.abdn.ac.uk/impact

International Confederation of Midwives: www.internationalmidwives.org

JHPIEGO: www.jhpiego.jhu.edu/global/mnh.htm

PAHO: www.paho.org/search/DbSReturn.asp

Partnership for Safe Motherhood and Newborn Health: www.safemotherhood.org

Population Council: www.popcouncil.org/rhfp/safemom.html

SAFE: www.abdn.ac.uk/dugaldbairdcentre/safe

UNFPA: www.unfpa.org/mothers/index.htm

UNICEF: www.unicef.org/health/index_maternalhealth.html

WHO: www.who.int/reproductive-health/

ANNEX SAFE International Research Partnership

SAFE group Advisory Board	Name Dr. Affette McCaw-Binns Dr. Ann Phoya Dr. Fariyal Fikree Dr. Marge Koblinsky Dr. Oona Campbell Dr. Paul Van Look Dr. Susan Murray	Institution University of West Indies (Jamaica) Ministry of Health and Population (Malawi) Population Council (USA) NGO Networks for Health (USA) London School of Hygiene and Tropical Medicine (UK) World Health Organization (Switzerland) King's College London (UK)
Collaborators	Bangladesh Dr. Mushtaque Chowdhury Professor A.K.M. Shahabuddin Dr. Yasmin Ali Haque Ms. Amina Mahbub Ms. Anita Chowdhury Dr. Faisa Kamal Ghana Dr. Sam Adjei Dr. Gloria Joyce Quansah Asare Ms. Mercy Abbey Dr. Alex Nazzar Jamaica Dr. Deanna Ashley Dr. Georgiana Gordon Malawi Mrs. Mary Kambewa Mrs. L. Kamwendo Mr. Dyton Maliro Mrs. Alice Mdebwe Mrs. T. Rashidi Mexico Dr. Ana Langer Dr. Bernardo Hernández Ms. Liliana Montejo Dr. Andreas Menjivar Dr. Leticia Suárez Dr. Sian Curtis Ms. Silvia Alayon	Bangladesh Rural Advancement Committee Institute of Child and Mother Health UNICEF Bangladesh Rural Advancement Committee Bangladesh Rural Advancement Committee Bangladesh Rural Advancement Committee Ghana Health Service Ministry of Health Ghana Health Service Ghana Health Service Ministry of Health Ministry of Health Ministry of Health and Population Kamuzu College of Nursing University of Malawi Ministry of Health and Population Ministry of Health and Population The Population Council National Institute of Public Health National Institute of Public Health National Institute of Public Health National Institute of Public Health MACRO International Inc. (USA) MACRO International Inc. (USA)
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UNFPA, the United Nations Population Fund, is the world's largest international source of funding for population and reproductive health programmes. Since it began operations in 1969, the Fund has provided nearly \$6 billion in assistance to developing countries. At their request, UNFPA works with governments and non-governmental organizations in over 140 countries. With the support of the international community, it supports programmes that promote the reproductive health of men, women and young people. Reducing maternal mortality and morbidity is one of UNFPA's priority areas of action. The Reproductive Health Branch, supported by the Technical Support Division of UNFPA, spearheads UNFPA's safe motherhood initiatives. More information about UNFPA can be obtained at: www.unfpa.org

The University of Aberdeen is the coordinating centre for SAFE and IMMPACT, global research initiatives with the goal of reducing deaths and serious morbidity owing to pregnancy and childbirth in the developing world. The Dugald Baird Centre for Research on Women's Health, headed by Professor Wendy Graham, is responsible for directing these research initiatives. SAFE was funded by the United Kingdom's Department for International Development and the European Commission. IMMPACT is funded by the Bill & Melinda Gates Foundation, the Department for International Development, the European Commission and the US Agency for International Development. The funders have no responsibility for the information provided in this paper. The views expressed herein are solely those of the authors.

For more information about SAFE and IMMPACT, please visit:
www.abdn.ac.uk/dugaldbairdcentre/safe and www.abdn.ac.uk/impact