



Royal Tropical Institute

Review of global literature on maternal health interventions and outcomes related to provision of skilled birth attendance

Ann Canavan

KIT Working Papers Series
WPS.H3

KIT Working Papers

KIT Working Papers cover topical issues in international development. The aim of the series is to share the results of KIT's action research in preliminary form with development practitioners, researchers and policy makers, and encourage discussion and input before final publication. We welcome your feedback.

Copyright

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 Unported Licence. © Royal Tropical Institute 2008

Correct citation

Please reference this work as follows:

Canavan, A. (2009) *Review of global literature on maternal health interventions and outcomes related to skilled birth attendance* KIT Working Papers Series H3. Amsterdam: KIT

Contact the author

Ann Canavan a.canavan@kit.nl

Download

The paper can be downloaded from www.kit.nl/workingpapers.



Royal Tropical Institute
KIT Development Policy & Practice

About KIT Development Policy & Practice

KIT Development Policy & Practice is the Royal Tropical Institute's main department for international development. Our aim is to contribute to reducing poverty and inequality in the world and to support sustainable development. We carry out research and provide advisory services and training on a wide range of development issues, including health, education, social development and gender equity, and sustainable economic development.

Website: www.kit.nl/development

More KIT publications: www.kit.nl/publications

Acknowledgements

This paper was inspired by recent initiatives to address the growing burden of maternal morbidity and consequent mortality among women in developing countries. In an effort to resolve the underlying causes of high maternal deaths by improving maternal health interventions, research is vital to inform policy and practice. One of the most pertinent issues that require a continued research focus is that of the provision of skilled birth attendance and effects on maternal health outcomes. This review paper endeavours to capture the various approaches, results and challenges met across a range of countries and programs, with respect to improving the quantity and quality of care provided to women before, during and after pregnancy. This formative review is therefore intended to lay out a research agenda, on the effects and impact of skilled birth attendance on maternal health. In addition, the paper intends to inform future formative research on effects of scale up of skilled birth attendance in Yemen, in collaboration with the Ministry of Health and supported by KIT, HCI and LATH consortia as funded by the Dutch government. And finally, sincere appreciation to both Korrie de Koning (Area Leader for Health, KIT) and Kathy Herschderfer, (maternal health specialist) who were instrumental in providing technical guidance and editorial support for the writing of this paper.

Table of contents

Working definitions	1
Section 1: Background and rationale for review	2
Section 2: Community-based interventions for maternal health	7
Section 3: Skilled birth attendants and efforts to reduce maternal mortality	11
Section 4: The need for multifaceted approaches to combating maternal mortality	19
Section 5: Challenges to routine monitoring of maternal health interventions and evaluations of impact	22
Annex I: Bibliography	28
Annexe II: List of networks and related initiatives for maternal health	31
Annex III: Abstracts on skilled attendance during pregnancy and delivery	32
Annex IV: Review of intervention studies for maternal health	40
Figure 1: Global causes of maternal mortality	4
Figure 2: Key messages for birth preparedness	8
Figure 3: Skilled attendance at birth saves mothers and babies	11

Working definitions¹

Skilled birth attendant: 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 (or skilled care): 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.

Traditional birth attendant (TBA): 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 are not included in the definition of a skilled attendant.

Enabling environment: In the context of safe motherhood, 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.

Maternal morbidity: Refers to serious disease, disability or physical damage such as fistula and uterine prolapse, caused by pregnancy-related complications. Maternal morbidity is widespread, but not accurately reported.

Maternal mortality: According to the Tenth International Classification of Diseases, a maternal death is defined as “the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.”

Maternal mortality ratio: The number of maternal deaths per 100,000 live births measures the risk of maternal death among pregnant or recently pregnant women. A more precise measurement would be the number of maternal deaths per 100,000 pregnancies, to account for those who die from unsafe abortions. However, data on number of pregnancies are difficult to obtain.

¹ All of the above working definitions are drawn from official guideline documents including WHO Maternal and Newborn survival and health guidelines (2006), Integrating management of pregnancy and childbirth (WHO 2007) and UNFPA Safe Motherhood program (2007).

Section 1: Background and rationale for review

The Maternal Mortality working group have recently presented new estimates of MMR, reporting a total of 536,000 maternal deaths in 2005 thus an average of 402 deaths per 100,000 live births, with 50% occurring in SS Africa (900/100,000 live births) and 45% in Asia. Hill,(2007)². The MM Network highlights the difficulty in obtaining accurate measures of maternal mortality and morbidity; in part attributable to the nature and outcome of the measure in question. With weak health information systems, it's also difficult to obtain reliable measures even in countries with more advanced health information systems (egg, India and China). Most significantly the highest MMR rates are in sub-Saharan Africa (SSA) and South Asia according to a recent study by the Maternal Mortality Network.

This paper aims to provide an overview of some of the recent findings on maternal health interventions and outcomes, more specifically focused on the role of skilled birth attendants. It will capture the significant results of key studies conducted in developing countries, with special attention to vulnerable women and their families who live in remote rural communities out of reach of functioning referral health services. The main purpose of the paper is to. review the evidence for the effectiveness of skilled birth attendance and the role of TBAs, to analyse the research methodology used and to identify gaps in research linked with maternal health outcomes. This formative review will help to guide future research in the effectiveness of skilled birth attendance.

The search strategy included use of PubMed and the Lancet series, which was complemented by recent secondary evaluation reports and other sources on maternal health from international agencies and academic institutes.

The evolution of maternal and newborn health programs

The evolution of maternal and newborn health programming has led to a series of guidelines and protocols³ that have been developed to guide practitioners on best practice and ultimately lead to providing a comprehensive package of maternal and newborn healthcare. Linked directly with access to skilled health providers, UNFPA⁴ have defined priority actions that are imperative for safe motherhood including the following key practices;

- all women receive or have access to information on reproductive health, counselling and services for prevention of unwanted pregnancies
- all pregnant women have access to skilled medical care during and after pregnancy, and care for the newborn
- geographic, socio-cultural, economic, legal and regulatory barriers that impede access to skilled health care are addressed
- The capacity of the health system at all levels is strengthened for efficient and effective delivery of reproductive services

Traditional birth attenders have been a corner stones in support to mothers giving birth in rural villages throughout developing countries for centuries. In the past decades, WHO and other health agencies (UNFPA, UNICEF) promoted training of TBAs in order to improve access to safe delivery and scale up

² Hill, K. Abou Zahr, C. on behalf of the Maternal Mortality Working group. Estimates of MMR worldwide between 1990 – 2005. *Lancet* (2007) 370: 1311-19.

³ WHO, UNFPA, UNICEF and World Bank, IMPAC; *Managing complications in pregnancy and childbirth; a guide for midwives and doctors*. Geneva WHO; 2000.

⁴ UNFPA, UNICEF and WHO (2003). *Guidelines on monitoring the availability and use of obstetric services*. New York.

coverage of maternal and reproductive health services. This initiative became a public health strategy as advocated by UNICEF in the 1950s who pursued provision of delivery kits to TBAs. Following the Alma Ata in 1978, efforts were focused to strengthen the links between traditional birth attenders in the community and the public health system⁵. Evidence of increasing maternal mortality rates and limited impact of untrained TBA interventions led to a rethink on more effective strategies.

More recently, efforts to transition to skilled birth attendance has resulted in promotion of training and in-service mentoring of TBAs in order to enhance their competencies. Due to the variance in both the content, duration and the quality of training provided in many countries by government services, NGOs, and private sector clinics, this has resulted in lack of standardized approaches and in some cases actually exercising extended roles of TBAs. According to one study⁶ which advocates for TBAs to provide rapid HIV testing, they caution on issues related to illiteracy associated with training outcomes and confidentiality. They advocate for the use of TBAs within communities to be studied more extensively while exercising concern about such extended roles.

A distinction thereby needs to be made between traditional birth attendants and skilled birth attendants, to identify the minimum core competencies that are mandated to ensure safe basic obstetric provision. Following lengthy debate among practitioners, agreement has now been reached on definitions of TBAs and skilled birth attendants. The WHO "*skilled attendance at birth policy*" as developed in 1997 remains today but has been incorporated into a broader framework that covers the continuum of maternal and child healthcare policy, developed and implemented by the Partnership for Maternal, Newborn and Child Health (PMNCH) which was launched in 2005.

Current working definitions of TBAs and SBAs are as follows:

Traditional birth attendant (TBA)⁷: 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. The 2004 joint document states: "the term TBA refers *only* to traditional, independent (of the health system), nonformally trained and community-based providers of care during pregnancy, childbirth and the postnatal period."

Skilled birth attendant⁸: is an accredited health professional such as a midwife, nurse or doctor who has been educated and 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 labor 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.

While in most developed countries, it is assumed that most births take place in the hospital, in developing countries, the majority of births occur in the home. Typically in contexts such as remote rural villages, home births are attended by untrained birth attenders or relatives of the woman. The proportion of births attended by skilled health practitioners was reported to increase in the

⁵ Sibley, L. Sipe, T. (2006) Is there a future role for trained TBAs? J Health Popul Nutr, 24(4): 472-478.

⁶ Bulterys, M. et al (2002), Role of TBAs in preventing perinatal transmission of HIV. BMJ, 2002, 24; 222-225.

⁷ WHO, FIGO and ICM all recognize TBAs as working independent of the formal health system.

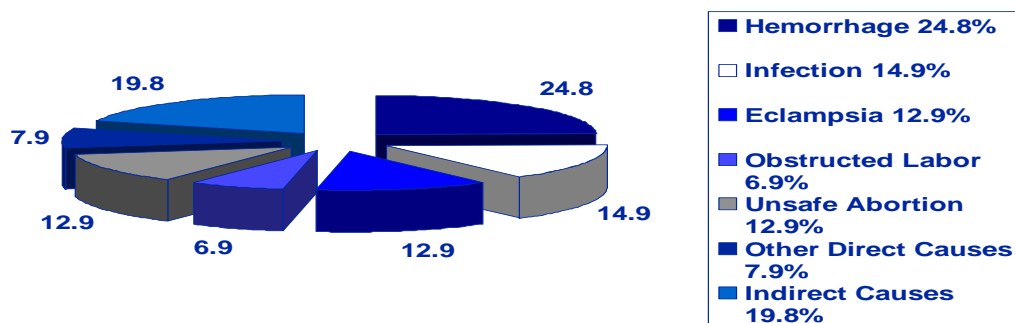
⁸ WHO (2004) Making pregnancy safe; critical role of skilled birth attendant. A joint statement by WHO, ICM and FIGO. Geneva; WHO.

developing world from 1990-2004. Over the last 15 years, all regions have shown improvement in the proportion of skilled assisted births with current estimates averaging 56% across the developing world.

This estimate does not reflect the very low level of skilled care provided in some developing countries. For example, in Yemen only 22% of births are actually attended by a skilled provider with a total of 77% of all deliveries taking place in the home, thus assuming that most births are unattended or supported by an untrained provider. This concurs with data from SS Africa and South Asia which suggest that only 15-30% of women receive skilled care at delivery with wide variations between rural and urban areas.

Of course there are also economic factors that influence the chances of women accessing skilled birth care and surviving the trimesters of pregnancy and delivery of a healthy baby. With only 34% of the poorest women receiving services compared to over 80% access to services by the richest women this demarcates remarkable socio-economic disparities in access to healthcare. Since over 85%⁹ of the maternal mortality is occurring in SS Africa and South Asia regions low rates of skilled birth attendance has serious implications for maternal health.

Global Causes of Maternal Mortality



Current Approach to Reduction of Maternal Mortality

8

Figure 1 Global causes of maternal mortality

http://www.who.int/reproductive-health/publications/maternal_mortality_2005/index.html

Global causes and implications of maternal mortality

Before moving to explore the impact of skilled birth attendance, it's useful to explore briefly the major causes of maternal mortality. This is of significance in terms of who is best qualified to stabilize and manage emergency obstetric complications when they do arise. It raises the question; are health providers such as community midwives in a position to assume responsibility for identification of risk signs and management of presenting complications? This will be addressed in the next section but first it is important to know what complications occur.

The main causes of maternal death include haemorrhage, infection, eclampsia obstructed labour and unsafe abortion (*see Figure 1*) If detected in time,

⁹ Source; estimate from 2005 publication, WHO,UNFA,UNICEF,WB)

quality emergency obstetric care (EmOC) services are accessed and complications are managed appropriately, these problems do not have to lead to death or severe disability. The question remains, which skills and competencies are needed by the birth attendants conducting the majority of deliveries in the home in order to recognise the risk signs and intervene with appropriate management, in the absence of a nearby emergency obstetric service? Timely detection of obstetric complications and emergencies is also a matter of help-seeking attitudes and behaviours at the community level.

This issue is also linked to the question of health system capacity to identify and manage risk pregnancies and provide timely emergency obstetric care which is still in doubt in some countries; frequently the problem lies with weak health systems and lack of trained staff, absence of essential supplies, drugs and equipment, which are essential to obstetric care provision. These systems deficits are of major consequence when speaking about averting maternal deaths and morbidity.

Freedman et al (2007)¹⁰ states that the field of maternal health has many examples of pursuing an intervention which has little effect on health outcomes due to failure to address the necessary health system support. To summarise here are some findings from a needs assessment that highlight the deficits in emergency care;

- Geographic distribution of facilities for emergency obstetric care is a challenge, especially in rural areas while quality of care is also a major concern in most health facilities. This is borne out in evidence of competency based assessments in this review paper.
- Met need for emergency obstetric care is low, National needs assessments; met need was only 28% across nine African countries, suggesting that too many women are not receiving treatment for obstetric complications.
- Caesarean delivery rates surveyed in African and Asian countries were less than 3% where the UN recommended range is 5%-15%.

The continuum for maternal, newborn and child care is now the recommended model using a health systems approach as advocated by the PMNCH and the international community. A range of definitions exist to address the various levels with varying priorities. It promotes access by families and communities, by outpatient and outreach services and by clinical services, attending the full life cycle approach. It advocates for high coverage and quality of integrated service delivery packages with functional linkages between the levels of care, so the care can contribute to the effectiveness of all the linked packages¹¹.

Studies suggest that high coverage and quality of essential packages of care could avert 67% of neonatal and child deaths in 60 priority countries. Attribution for maternal mortality is more difficult due to the complexity of measures and outcomes as previously highlighted by the Maternal Mortality Network. Linkages between integrated packages can maximise efficiency according to the Lancet reviewers who have studied over 190 interventions and grouped the interventions into eight service delivery packages that are feasible in low and middle income countries. It is beyond the scope of this review to analyse the packages further but there are some significant recommendations made that need to be considered when undertaken formative research into maternal and newborn health and outcomes that are often within reach of local communities to influence as demonstrated by studies such as;

¹⁰ Freedman, L.P. et al (2007) Practical lessons learned from global safe motherhood initiatives; time for a new focus on implementation. *Lancet* 370; 1383-91.

¹¹ Kerber, K. et al (2007), Continuum of care for maternal, newborn and child health, from slogan to service delivery. *Lancet* 370; 1358-69.

- *Participatory processes*¹² have been used in communities to foster mobilization among women's groups as a means to promote demand for maternal and child health services, formulate solutions to problems such as emergency transport. The participatory processes brought care closer to the home and improved linkages with the health system through renovations to the local dispensaries and health centres, improved transport links and more accountability by local health workers to their community.
- As part of the same series of *studies in Nepal*¹³, results of community based MNH interventions reports that more women received ante natal care, using a trained birth attendant, improved use of hygienic practices than women in the control group. Fewer maternal deaths were reported (69/100,000 live births) in the intervention area compared to 341/100,000) in the control group over a 4 year period. This affirms that birth outcomes and healthy behaviours can be improved while focusing on a continuum of community to health facility-based care.
- Costello (2006)¹⁴ advocates for more community based interventions given that the majority of women still deliver at home in the low income countries, where the highest rates of maternal mortality occur. In Malawi a randomised control trial is been implemented (similar to Nepal), with a cohort of 150,000 women to asses two community based health promotion interventions that empower women's groups to solve problems related to their own health and demand for health care. The interventions aim to improve service delivery at facility level as well. The results are not yet available for this study but the study design can be accessed at: www.who.int/pnmch/activities/africannewborns/en/index.html)

¹² Manandhar, DS. (2004) Effect of a participatory intervention with women's groups on birth outcomes in Nepal. Lancet 368; 1248-53.

¹³ Barker, C. et al., 2007. Support to the Safe Motherhood Program in Nepal: An Integrated Approach; accessed at <http://www.options.co.uk/options.com>

¹⁴ Costello, A. et al (2004). Reducing maternal and neonatal mortality in the poorest communities. BMJ 2004; 329; 1166-8.

Section 2: Community-based interventions for maternal health

Various models have been developed to address the different levels of healthcare necessary for the reproductive cycles of a woman's life including the ante and post partum stages. One of the most widely applied models used in maternal health programming today is The Three Delays model which promotes the presence of a skilled birth attendant who is linked to a functioning health system.

The three delays model developed in the 1990s¹⁵ and was adapted in various country contexts through a series of operational research studies led by Columbia University, to strengthen the coverage and quality of maternal health services at community and health facility levels.

Based on the **three-delay framework**, as developed and implemented by the Prevention of Maternal Mortality network¹⁶, states three major factors that contribute to maternal death including:

- 1) delay in recognising complications and deciding to seek care
- 2) delay in reaching a treatment facility, and
- 3) delay in receiving adequate care and treatment at the facility.

This model can be further elaborated to explore the factors that contribute to the delays at each of the three stages. Examples of major gaps and systemic weaknesses that exacerbate already high rates of maternal morbidity and mortality include:

- Shortage of and thus inadequate access to skilled care
- Poor health infrastructure at all levels (including supplies, equipment)
- Lack of transportation for emergency referral
- Low quality of Obstetric care

The three delays model has subsequently been used to inform a comprehensive approach to birth preparedness with prevention and management as integral components of the plan. *The elements of Birth preparedness have been promoted by WHO, UNFPA and other international agencies as part of maternal health strategies. With the shift from TBA training and risk screening towards access to skilled attendance, including emergency obstetric care as a means of decreasing maternal mortality this approach has been adopted widely by NGOs and government services. (WHO/UNFPA/UNICEF/World Bank, 1999)¹⁷. Maine (2007)¹⁸ critiques this approach however, suggesting that it has been promoted heavily in the absence of evidence that it actually works. Some evidence suggests in fact that birth planning does not change behaviour and it assumes that people can afford to access health facilities that are functioning and that the quality of care provided is at an acceptable level. This will be further elaborated in the discussion to follow.*

Birth preparedness as a conceptual framework provides an opportunity to address the three delays but is contingent on other external factors such as existence of functioning referral services. Birth Preparedness is a process through which (pregnant) women and their family members are provided with

¹⁵ Thaddeus S, Maine D (1994) *Too far to walk: maternal mortality in context; Social Science and Medicine* 38(8): 1091-1110

¹⁶ Kamara, A. (1997) *The international federation of gynecology and obstetrics; lessons learned from the PMM network experience. Int J Gynecol Obstet.* V59 (Suppl 2) 253-258.

¹⁷ WHO/UNFPA/UNICEF/World Bank **1999** *Reduction of maternal mortality – a joint WHO/UNFPA/UNICEF/ World Bank statement*; Geneva: World Health Organization, available at: http://www.who.int/reproductive/health/publications/reduction_of_maternal_mortality/e_rmm.pdf

¹⁸ Maine, D. (2007) *Detours and shortcuts on the road to maternal mortality reduction.*

key messages associated with pregnancy and childbirth to ensure a healthy outcome for both mother and newborn.

In addition to Birth Preparedness, it is necessary to ensure or enhance the quality of emergency obstetric care at the referral facility while also making provision for emergency transport in the event of an emergency.

Key messages for birth preparedness

- Having a skilled provider attend each birth
- Knowing the signs of complications before, during and after delivery
- Being prepared for a clean delivery
- Having some cash available for emergencies
- Having identified transportation for emergencies
- Having identified a person to accompany the women to the hospital in emergencies
- Knowing where to go if an emergency occurs

(Adapted from Gerein, (2003)¹⁹

Figure 2: Key messages for birth preparedness

Figure 2 above as described by Geerin (2003) depicts how Birth Preparedness is seen to address the three delays. The Birth Preparedness framework can be critiqued for being based on the assumption that if knowledge about complications and treatment options is increased, and practical barriers, such as the availability of cash and means of transportation are removed, behaviour will change accordingly and the utilisation of emergency obstetric care services will increase. In line with non-health determinants such as educational, social and economic indicators, this assumption has also been challenged in other reviews, stating that it does not take into account the complexity of behaviour change and the multitude of factors that determine and influence behaviour²⁰. We can conclude from this critique that in order to enhance behaviour change, the implementation of a Birth Preparedness project needs the continuous involvement and participation of community and health system stakeholders, so that other contributing and inhibiting factors can be recognised, accounted for and managed accordingly. This point has major consequences for how maternal health programs are designed and implemented. It also raises the question; to what extent operational research is taken into account at the design stage to address wider determinants and study their concomitant influence on MH outcomes.

The Birth Preparedness approach has met with successes and is used widely in countries where maternal health has substantially improved due to successful interventions. Countries including Egypt, Honduras, Malaysia, Sri Lanka, Thailand and parts of Bangladesh are all reported to have halved their maternal mortality ratios over the past decades²¹; they have been successful in (i) scaling up coverage of skilled providers and (ii) in increasing the utilisation of

¹⁹ Gerein N, Mayhew S, Lubben M. (2003). A framework for a new approach to antenatal care; *International Journal of Gynecology and Obstetrics* 80: 175-182

²⁰ Muna L, Ross JL, et al. (2002). Failure to comply? Anthropological perspectives on refusal of emergency obstetric care in rural Bangladesh; in Nurul Alam SM (ed) *Contemporary anthropology – theory and practice*; Dhaka: The University Press maternal Limited

²¹ Pathmanathan, I. et al (2003). Investing in health strategy; learning from Malaysia and Sri Lanka. H&P series. World Bank (2003).

emergency obstetric care services. For example, in Dinajpur, Bangladesh, where CARE, UNICEF and the Government of Bangladesh implemented a Birth Preparedness project, the EmOC utilisation rate increased from 16% to 40% of expected complicated deliveries over the 2 year project period²². Some authors reflect on the Bangladesh successes in the light of concurrent social and gender developments that contributed to the positive outcomes, while women were more empowered with enhanced opportunities to access education, literacy increased and thus quality of life indicators improved.

ANC: Its role and value in birth preparedness

The entry point for birth preparedness is routinely through the ante natal services where the woman is expected to attend for comprehensive screening, prevention and care ideally at least four visits during the trimesters of pregnancy, ANC is usually provided at primary healthcare level as part of a basic package of maternal healthcare.

Studies have noted that the greatest increase in maternal service interventions has focused on provision of ANC with an average increase of 20% across regions of the world. Notable increases in Asia where service rose by 13% from 1990-2000, while it is stated that women in Asia have the lowest ANC uptake across the regions studied²³. By contrast in SS Africa the increase in the same period was only 4% but a notable 75% of women use ANC services. However, the high levels of MMR in SS Africa may well suggest poor quality of care at ANC among other institutional and community based factors.

The value of antenatal care in reducing maternal mortality and morbidity has been questioned, by arguing that most life-threatening complications can not be predicted or prevented by screening during pregnancy and occur most commonly in pregnancies that are considered low-risk²⁴. The efficacy of ANC packages may have limited potential to affect maternal mortality ratios²⁵. However, it has also been argued that antenatal care offers a unique opportunity to educate pregnant women and their partners on healthy behaviours, danger signs, who to contact and where to go in case of problems and other topics related to pregnancy, childbirth, puerperium and childcare, and to help plan for a safer delivery. In addition, antenatal care may allow for the development of a relationship between pregnant women and the public health system, especially the midwife. In this context, the skilled birth attendant has a major role to play in providing screening and preventive services during the stages of pregnancy while also identifying risk signs (pre-eclampsia, anaemia) that will render the women vulnerable to serious complications and even death.

Unfortunately, the poor quality of ANC services in terms of preventing, diagnosing and treating complications has been observed but this has not deterred women from accessing ante natal services. Coverage of ANC first visit was reported to average 68% in poor countries, which is indicative of multiple entry points (PHC and outreach services provide ANC) for relatively low cost healthcare according to the health practitioners. The ANC attendance rates however tend to fall off in successive visits with women rarely receiving the requisite four ANC visits during pregnancy.

²² Report from CARE website for Maternal & RH interventions; www.care.org

²³ WHO and UNICEF (2003). Antenatal care in developing countries; promises, achievements and missed opportunities. Geneva WHO-UNICEF.

²⁴ AbouZahr, C. et al (2001), *Maternal mortality at the end of a decade: signs of progress*. Bulletin of WHO. 79; 561-73.

²⁵ Villar, J. et al (2001) *WHO antenatal care in preventing maternal mortality and serious morbidity*. Lancet (2001) 357; 1551-64.

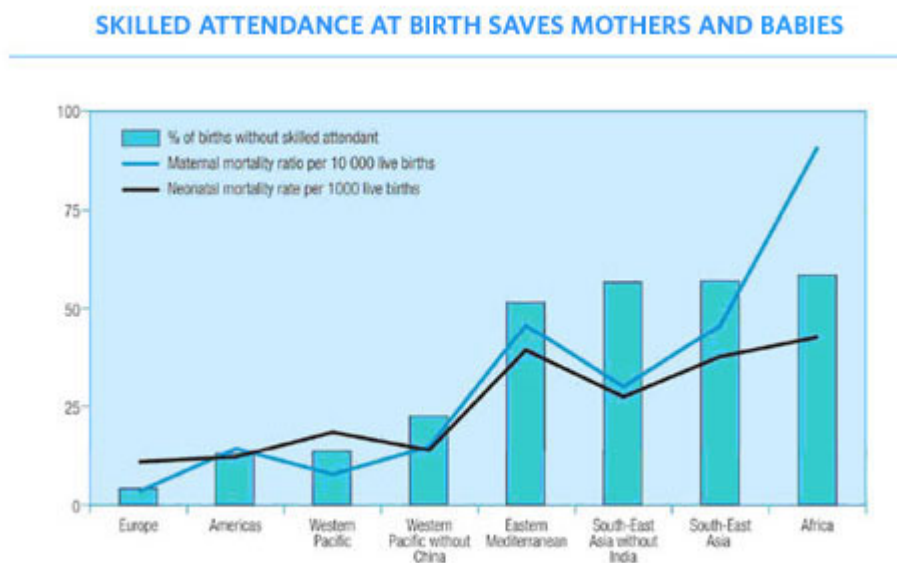
Equally significant is the poor quality of post natal care. Most deaths occur in women and newborn during the post-partum period with 45% of maternal deaths and 25%-45% of newborn deaths occurring within 1 day of delivery. Yet, coverage of post partum care remains extremely low with post natal visits as low as 5% in some developing countries. This can be largely explained by the low level of skills among health workers to render partum care provision coupled with poor access by the women. Seven out of ten women delivering in the community do not receive any post partum care; in fact the proportion of women with no post partum care can range from 50% - 95%²⁶. Rates of 80% among women delivering in institutions are observed in countries such as Bangladesh, Colombia and Egypt where maternal mortality is reported to have reduced significantly over the past 30 years.

The question here is one of attribution and the significance of the contribution of such services to the survival rates of women. Other development indicators are also shown to have a significant effect on the quality of life indices of women and have contributed to improved survival rates during the reproductive years. This will be explored again later in reviewing the current approaches used in evaluative studies in Section 5.

²⁶ Lawn, JE. (2006). Where is maternal and child health now? *Lancet* (2006). 368; 1474-77.

Section 3: Skilled birth attendants and efforts to reduce maternal mortality

Recent research demonstrates that delivery by a skilled birth attendant (SBA) serves as an indicator of progress towards maternal mortality worldwide whereby estimates between 13% - 33% of maternal deaths could be averted by the presence of a skilled birth attendant²⁷. This is amply demonstrated by the graph in *Figure 3* where WHO data analysis (2005) shows the association between absence of skilled attendance and maternal mortality. Analysis of DHS survey data from 44 countries²⁸ (1999-2004) showed that the proportion of deliveries assisted by TBAs is extremely variable within and across countries, being highest in rural areas. The proportion assisted by SBAs is actually comparable to the number of deliveries assisted by family members and no persons combined.



SOURCE: World Health Organization, April 05

Figure 3: Skilled attendance at birth saves mothers and babies

Traditionally, the main provider of such services was the untrained birth attendant which continues to be the practice among the poorest communities in developing countries. An intermediate approach was adopted largely supported by NGOs delivering primary healthcare services through provision of short course training to traditional TBAs. Averting maternal deaths has not been achieved uniquely through the existence of low skilled Traditional birth attendants (TBAs) and thus does not result in reduction of maternal mortality. Several studies²⁹ point to the fact that there has been no improvement in maternal mortality rates where traditional TBAs are the main provider of care to the pregnant woman. In 1999 WHO explicitly stated that "there is no reason to believe that TBA training can contribute to MMR reduction in isolation"³⁰ This was amply demonstrated in a study in Pakistan where TBA interventions led to a decrease in perinatal mortality but did not lead to a significant reduction in

²⁷ Graham, W. Bell, JS. Bullough, W. (2001). *Can skilled attendance reduce maternal mortality in developing countries*. Stud HSO&P. 17 (97-129).

²⁸ Sibley, LM. Sipe, TA. (2004). What meta-analysis can tell us about TBA training and pregnancy outcomes. *Midwifery*. 20; 51-60.

²⁹ *ibid*

Sibley, L. Sipe, T. Koblinsky, M. *Does TBA training improve referral of women with obstetric complications*. *Soc Sci Med* (2004) 59; 1757-68.

³⁰ WHO (1999). *Reduction in maternal mortality: A joint WHO/UNFPA/UNICEF/World Bank statement*.

MMR³¹. Assessments in Indonesia, Brazil and Guatemala demonstrated the success of TBAs recognition of early signs of complications and successful referral for emergency obstetric care.

While it is recognized that TBAs can and do provide emotional and social support to the mother and can provide key health education messages, women rely on TBAs where there are no skilled birth attendants available or where they cannot afford the cost of professional services. TBAs however are not an acceptable substitute for skilled attendant at birth according to several studies³². Based on such evidence, practitioners and maternal health policy makers now conclude that TBAs (untrained) do play an important role in traditional societies but need work in tandem with qualified community midwives and other skilled birth attendants at facility level

Quality of care by TBAs

Given the new facts and evidence of the need for skilled health providers, how can we ensure that coverage equals quality of care? The proportion of women delivered by an SBA is measured by WHO³³, using household survey data³⁴. This survey method is a tracking of total numbers of SBAs, it does not measure the level of skill of the provider. A recent operational research study focused on measurement of skills among the cadres of skilled birth attendants³⁵ to address the competence gap that is assumed to exist for management of selected obstetric and neonatal complications.

The gap between evidence based standards for skilled management of basic and emergency obstetrics and actual practice among skilled birth attendants is however a subject of debate in the more recent literature. International standards and operational definitions do not automatically lead to the education and/or training of SBAs who demonstrate competency in their midwifery and obstetric care practices. It is suggested that a great deal of stagnation of maternal health programmes has been the result of confusion and careless choices between scaling up truly skilled birth attendants or multi-purpose workers in large quantities and with short training, fewer skills, limited authority and no career pathways.³⁶ Improving coverage and quality of skilled birth attendants is therefore prioritized in current approaches to maternal health.

Other systemic determinants identified in operational research and observational studies³⁷ that can undermine provider competence and efficiency include; disparities in the quality of training provided, poor health system infrastructure, lack of enforcement and adherence to national norms and practices, lack of basic supplies including drugs and consumables and overall gaps in quality of care.

Based on the premise that improving maternal health relies on delivery by skilled birth attendants and quality referral services; access to emergency

³¹ Jokhio, AH. (2005). *An intervention involving TBAs and perinatal and maternal mortality*. N England J of Med. 352: 2091-99.

³² Based on empirical evidence, it is now established that management of the high risk pregnancies and ensuing complications should be carried out only by a trained midwife or other skilled health professional.

³³ See www.who.int/reproductive/global_monitoring/skilled_attendant.html for full details of the methodology adopted for estimations of the % of women delivered by SBAs.

³⁴ WHO adopt a household survey methodology, to ask women what type of health professional assisted recent deliveries; classified by cadres including, doctor, Midwife, nurse, TBA, relative.

³⁵ Harvey, S. et al (2007). *Are skilled birth attendants really skilled: A measurement method, some disturbing results and way forward*. Bulletin of the WHO. October 2007, 85(10)

³⁶ Fauveau, V. Et al (2008) Human Resources for maternal Health: Multi-purpose of specialists. *Human Resources for Health* 2008, 6: 21 (30 September 2008)

³⁷ Gill, K. et al (2007). Women deliver for development. *Lancet* (2007); 370: 1347-57.

obstetric care is fundamental to reduction of maternal deaths. Adequate numbers of skilled health providers are essential where core competencies are a pre-requisite to ensuring best practices and improved quality of maternal healthcare. While acknowledging that many of the formal assessments conducted to date focus largely on established health facilities, it is important to observe that most women in remote rural areas rely on family or the TBA when giving birth and the nearest referral facility may be hours away. In such cases and where complications arise, basic life saving skills and emergency obstetric and neonatal care is crucial to saving the life of the mother and baby.

A review of the evidence of skilled birth attendance and related maternal health outcomes

Abstracts of all relevant studies can be found in *Annex II*, this review focuses of a few select studies, in order to review the methodologies used and elaborate on the results of retrospective and prospective studies as follows;

- 1 Meta analysis of outcome-based studies on effects of TBA/SBA training
- 2 Competency-based assessments of SBAs
- 3 Studies on other determinants of reduction in maternal mortality

1. Meta analysis of outcome-based studies on effects of TBA/SBA training

Efforts to respond to the gaps identified in competencies of skilled birth attendants is currently the focus of work by WHO and UNFPA in collaboration with a number of agencies supporting Ministries of Health in many developing countries.

Training programs that are designed to focus on the core competencies for improvement of management of complicated deliveries was conducted in the pilot countries including, Niger, Ecuador, Kenya, Benin, Bangladesh and Eritrea. SBA competency has become integral with maternal health programming in these countries using standard competency assessment instruments³⁸.

Sibley et al (2006) conducted a meta analysis of TBA training in order to (a) describe the effect of the training on TBAs knowledge and behavior and (b) determine the impact on pregnancy outcomes. They also do a meta analysis of the quality of literature available on TBA and maternal health outcome reviews.

A total of *60 studies* were included in the review with the major focus on TBA training, the intervention group were trained TBAs and beneficiaries of their care (mothers and neonates). Dependent variables studied included; knowledge, attitudes, behavior and maternal/peri- neonatal outcomes. It included both experimental and quasi-experimental studies across Asia, Africa and Latin America. The initial review was follow up with further meta reviews;

- In 2002, repeat review study included antenatal care and obstetric emergency referrals
- In 2004, a new search for studies included delivery and newborn care practices.

*Results of the meta analysis*³⁹ demonstrated that TBA training was associated with moderate to large improvements in behavior related to intrapartum and post natal care practices and small but significant decreases in peri natal

³⁸ See www.gapproject.org/stratssafemotherhood.html/sbacomp.html

³⁹ Sibley et al (2006) used a series of variance analysis tests with weighted means to measure the effects. See methodology in full report for details.

mortality and neonatal mortality. TBA training is also associated with small but significant differences in use of ANC and access to EmOC. The study was unable to correlate which interventions were associated with better outcomes and with cost effectiveness. Most importantly they were unable to draw associations between training and maternal mortality due to incomplete reporting in data sets. *Causality was therefore not measured, only magnitude and trends in direction of association between training and outcomes.*

A more recent study by Jokhio⁴⁰ in Pakistan offers encouraging evidence of TBAs contribution to reductions in maternal and newborn mortality; (*see Annex 2 for full abstract of this study*), they found that TBA training was linked to outreach and facility based care, resulting in statistically significant reduction of 30% of perinatal mortality. The estimated reduction for maternal mortality was similar but it was not significant. There are confounding factors associated with such positive evidence, as attribution can also be linked to other social and economic developments that evolved concurrently with the provision of skilled birth attendance and improvements in referral systems.

While swings between advocating for community based or facility based care in the context of maternal and newborn health exists, it's evident from conclusions of such meta analysis studies that trained TBAs can contribute to reduction in both maternal and perinatal mortality. Sibley (2006) estimates that with 90% coverage of skilled birth attendants present in developing countries, interventions for pregnancy, labor and post natal care up to 24 hours after birth would result in 15-30% reduction in newborn mortality with improvements in maternal health, but no comparable data exists for MMR projections. They advocate for urgent research on effects of community based interventions that reduce post partum hemorrhage, as it is one of the leading causes of maternal deaths.

2. Competency-based assessments of SBAs

Through its Safe Motherhood Research Program, the Quality Assurance Project (URC, QAP) implemented three studies to explore the competencies of SBAs in countries with high maternal mortality ratios. *See Annex II and bibliography references for full abstract of this study.*

- The first study (Phase I) examined the competency of SBAs using checklists and assessment tools piloted by the project team with a total purposive sample size of 166 health providers.
- Phase II refined the instruments (including adapting the knowledge assessment to an MCQ tool for ease of administering to SBAs), this phase used a bigger cohort of SBAs (#1358), in Nicaragua. The study measured SBA performance and the relative contribution to performance of different enabling factors in the work environment.
- A third study examined causes of in hospital delays (Third delay) in providing OB care. All three studies occurred between September 2001 and July 2002 in Benin, Rwanda, Ecuador, and Jamaica.

Phase 1 of the study included selection of a purposive sample of skilled health providers working at facility levels (district and secondary level hospital and primary level health centre) to determine their competency and knowledge levels. The study involved development and piloting of evaluation instruments for competency assessments in four countries (Jamaica, Benin, Rwanda and Ecuador). The study focused on (i) competency of skilled providers, (ii) enabling environment and influence on performance of providers and (iii) the

⁴⁰ Jokhio, A.h. et al (2005). An intervention involving traditional birth attendants and perinatal and maternal mortality in Pakistan. *N Engl J Med* 2005;352(20):2091-9

third delay at hospital level where observation checklists were used to ascertain time and motion for women admitted and treatment intervals. In a subsequent phase revised instruments were adapted to conduct a larger scale study in Nicaragua; with a total cohort of 1385 providers were assessed.

Instruments were developed to measure provider competencies using the universally agreed clinical standards and definitions⁴¹ focusing on diagnosis and management of the three direct causes of maternal mortality; pre-eclampsia/eclampsia, hemorrhage and sepsis. Knowledge levels were also assessed with written tests and skills were assessed using anatomical models and using materials from the MNH program and IMPAC guidelines.

Results showed a cumulative total of correct knowledge on 62% of the questions across all cadres of skilled providers. Auxiliary nurses (community midwives equivalent) were correct on 51% of the questions with demonstrated low knowledge on sepsis (9% correct), third stage labor management (16.7%), and use of partograph (52%). Such low scores on basic obstetric care including infection control, recognition and management of pre-eclampsia and ability to use and interpret the partograph is indicative of the poor level of healthcare provided to women in pregnancy.

Such variations in competency levels are also suggestive of wide disparities across a heterogeneous group of providers who are classified as skilled birth attendants. Maine (2007) expresses concern over the watered-down approach to skilled birth attendance. Skill scores were generally lower than knowledge level scores, which suggest that knowledge levels alone are no guarantee of correct procedures, been performed. Such disparities between knowledge and skill levels are also confirmed by monitoring studies conducted in Yemen by GTZ whereby quality assurance studies demonstrated that 40% of health facility staff trained in emergency obstetrics; follow up assessments showed alarmingly low levels of knowledge and even lower skill levels among known skilled birth attenders.

3. Other determinants of reduction in maternal mortality

Chowdhury et al (2007)⁴² conducted a study on determinants in MMR in Matlab, Bangladesh using 30 years of cohort data (1976-2005). The objective of this extensive study was to determine effective strategies for reduction of maternal mortality through assessment of the contributions of interventions such as skilled attendance at birth. Trends in MMR and interventions were examined in two adjacent areas over 30 years with analysis of cause of death and socio demographic determinants. They used routine data collected via household surveys (interviews with families to determine cause of death of women aged 15-49) and health information by international research centre (ICDDR) or by government (HMIS). Female interviewers followed up on all maternal deaths using a verbal autopsy questionnaire and cause of death was assigned by a doctor or medical assistant with classification by direct obstetric causes or indirect causes

A notable fall in MMR over the 30 years was revealed (68% in intervention areas and 54% in government areas), despite the low uptake of skilled attendance at birth. Attribution was related to improved access to EmOC with midwives facilitating access and notable increase in provision of caesarean sections. Overall, they advocate for investment in midwives, EmOC and safe

⁴¹ Where no agreed clinical standards existed, WHO'S Integrated Management of Pregnancy and Childbirth guidelines were adopted as an appropriate standard.

⁴² Chowdhury, M.E. et al (2007) Determinants of reduction in MMR in Matlab, Bangladesh. Lancet 370; 1320-28.

pregnancy termination. Wider socio-economic determinants were also acknowledged, female literacy, improved financial access for the poor; poverty reduction is considered essential to sustain the success achieved according to the authors of this study.

Interestingly, a prior impact evaluation of the community based maternity program in Matlab as conducted by Fauveau⁴³ in 1991 also highlighted that after the program had been in place for three years, the maternal mortality ratio due to obstetric complications was far lower in the program area than in a comparison area (1.4 versus 3.8 deaths per 1,000 live births). The authors conclude that posting trained and well-equipped midwives at the village level, who have access to an effective chain of referral, can improve maternal survival.

The methodology and approach used in the Bangladesh studies acknowledge that wider economic and social determinants had a major influence in reduction of MMR including women's education. The key characteristics of the population include the following;

- Predominantly Muslim area
- Tradition restricts women from seeking care outside the home, especially during pregnancy and delivery. (majority of deliveries are home-based)
- Largely agricultural rural area with poor economic status of families.
- Trained midwives are present at health centre level with basic obstetric care provision and referral for emergency services.
- Proportion of birth attended by a skilled provider through government services was very low (estimated at 4% in 1990's and increased to 14% in 2005).

A major recommendation from this study is that *intraparum care strategy at the health centre level* can reduce maternal mortality subject to referral services been ensured. The backbone of this initiative is the availability of skilled birth attendants, working within a district health system with adequate emergency obstetric care provision. To date there are no randomized control trials to determine the effectiveness of this strategy through comparison with controls such as areas where the traditional approach to MH is implemented. The authors call for more evidence based studies using designs other than RCTs in view of the causal link between the intervention and outcomes being complex. They also recommend as do other researchers that more investigation is required into what extent maternal health and development affect each other.

Victoria et al (2004)⁴⁴ recommend 3 useful and appropriate pre-requisites for valid causal inferences where RCTs are not used;

- Causal pathway must be short and simple
- Expected effect must be large and consistent with temporal sequence of the intervention
- Confounding must be unlikely.

Carlough & McCall (2005)⁴⁵ explored the use and measurement of skilled birth attendance in Nepal and implications for maternal well being. They were concerned by the shortages of skilled attendants in rural areas combined with

⁴³ Fauveau, V. et al (1991) Effect on mortality of community based maternity care. Lancet 1991; 338; 1183-1186.

⁴⁴ Victoria, C.G. et al (2004) Evidence based public health; moving beyond randomized control trials. Amer J Public Health; 94; 400-05.

⁴⁵ Carlough, M. McCall, M. ((2005). *Skilled birth attendance; what does it mean and how can it be measured? A clinical skills assessment of MCH workers in Nepal*. Int Journal of Gynecology and Obstetrics. (2005), V89, 200-208.

cultural and economic barriers mean that trained attendants are not available for most deliveries.

Typically, untrained maternal and child health workers or village volunteers are the most accessible cadre of health worker available to the woman in a remote rural village. In Nepal, with only 9% of births taking place within a health facility and 11% by skilled attendants, efforts to respond to this major gap in accessing basic and emergency obstetric care. Maternal and child health workers were trained for 6 weeks in basic emergency obstetric care in order to expand the provision of basic services. In Nepal following an extended study on the overall clinical skills and competencies of the basic cadres of skilled attendants the researchers⁴⁶. Finding show a range of barriers and constraints that are beyond the scope of the more immediate clinical care and can adversely affect the performance of the skilled birth attendant;

- Limited support for skilled birth attendants at family and community levels
- Lack of transportation and emergency funds for referral obstetric care
- Cultural and financial barriers to seeking obstetric services at all levels.
- Lack of quantity and quality of facilities providing comprehensive EmOC.
- Low capacity among supervisors and managers in health facilities
- National policies preclude health workers at all levels from performing tasks they are qualified to perform.

Results however demonstrated that the providers (MCHWs) who received refresher training were significantly more competent than the control group who had not maternal health refresher training. This leads us to explore the wider determinants of maternal mortality further to identify how the health system needs to interface with other systems to address the gaps that exist. Another equally concerning issue is that of identification of risk pregnancies and timely emergency obstetric referral. Stanton, C (2006) indicated that caesarean rates have been increasing outside Africa with increases ranging from 5-20%⁴⁷ with a current average of 12% indicated for developing countries. SS Africa however reports caesarean rates below the recommended minimum of 5%; suggestive of the chronic shortfall of life saving surgery in most African countries. In line with this finding, evidence of the met need for obstetric care by identification of medical indications suggest a major gap in life saving surgery; a huge disparity exists between rural and urban populations in accessing life saving interventions⁴⁸. This is now explored in line with studies on inequalities in access to maternal health care.

Socio-economic disparities are of concern whereby maternal mortality has a clear poverty gradient across developing countries. Inequalities are associated with education level, gender and livelihood opportunities which are shown to have a significant effect on survival rates during the reproductive years. While most maternal deaths occur at home, with the highest rates among the poorest; in Indonesia 33% of maternal deaths are among the poorest quintile. A Bangladesh study⁴⁹ by a local NGO partnership for home based SBA care showed significant inequities in access to services even within the NGO supported services. Inequities were primarily linked to woman's education, income, distance to nearest hospital, area of residence. Facility based services

⁴⁷ Stanton, C.K. (2006). Levels and trends in cesarean birth in the developing world. *Stud Fam Planning*. March (2006) 37; 41.

⁴⁸ Ronsmans, C. et al (2004) Measuring the need for life saving obstetric surgery in developing countries. *Br J Obs Gyn* (2004); 111; 1024-30.

⁴⁹ Anwar, I. (2007). Inequity in maternal healthcare services; evidence from home based SBA programs in Bangladesh. *Bulletin of WHO*; V86 (4) (2007).

resulted in higher inequities than home based care. The authors strongly recommend further research to understand what the poorest women see as the main factors that limit access to care, such as cost and quality of care as dependent variables.

A study in Indonesia⁵⁰ assessed the extent to which village midwife programs improved access to professional delivery care for the poorest people. Two key trend indicators were chosen as markers of maternal health (i) % of births attended by a trained provider and (ii) % of caesarean sections (as a proxy for access to emergency obstetric care). While Indonesia's strategy to increase skilled attendance (through investment in training and deployment of midwives) met with success in reaching the poor; skilled care was reported to have reached over 40% of the poorest in rural areas. This impressive trend obscured the unmet need for access to emergency obstetric care with CS rates of < 1%. Higher fees at hospitals have increased the costs for the poor which creates barriers to accessing health facility care. On a positive note, the authors conclude that the strategy of a midwife in every village has reduced socio economic inequalities but more research is needed into the barriers in accessing emergency obstetric care and how to overcome them.

⁵⁰ Hatt, L. Stanton, C. et al (2006). Did the strategy of skilled attendance at birth reach the poor in Indonesia. Bulletin of WHO, V85 (10) 2006.

Section 4: The need for multifaceted approaches to combating maternal mortality

In a review study on a call for action for maternal health in poor countries, Fillipi et al (2006)⁵¹ advocate for a broad perspective to move beyond mortality to include near misses (severe life threatening complications) and longer term sequelae (disabilities, quality of life indicators), with implication for the association between the mother, the fetus and the child. An estimated 10-20 million women develop disabilities due to complications in pregnancy or poor management thereof. They advocate for birth planning and attention to recurrent problems with opportunities to prevent complications and thus avoid likely physical and psychological sequelae for the women in the longer term.

This brings us to consider the implications of a comprehensive approach to maternal healthcare and moving beyond the immediate medical model to consider the wider social, educational and economic determinants. Some studies have considered these determinants and more recently in view of meeting the MDG 5 target of reduction of maternal mortality by 2/3 by 2015, prospective studies have focused on the feasibility of going to scale and how to avert maternal mortality and morbidity.

Strategies for reducing maternal mortality: getting on with what works

In a systematic review of strategies adopted to reduce maternal mortality; using grey literature sources and published reviews, Campbell et al (2006)⁵² suggests a series of key messages extrapolated from the collective findings;

- No single intervention (e.g. drug treatments, health education) alone will reduce the rate of maternal mortality
- Strategies will work if the component packages are effective with high coverage of the target group
- Epidemiology of maternal mortality requires prioritization of the intrapartum period. This finding is further substantiated in the literature whereby health centre intrapartum care is advocated as a promising strategy by researchers⁵³.
- Further opportunities to avert maternal deaths will arise during the ante-natal care, post partum care, family planning and safe abortion. This affirms the need for a continuum of care approach which addresses the reproductive life cycle and not only pregnancy.

Essentially, this review concludes that a *comprehensive package of services* is required with a *continuum of care approach* from birth preparedness including ANC to delivery interventions and post partum care. Intrapartum care is identified as the most critical phase when complications can occur and can only be managed by qualified health professionals (here known as the cadre of SBAs).

⁵¹ Fillipi, V, et al (2006). Maternal health in poor countries; the broader context and a call for action. *Lancet* (2006) 368; 1535-41.

⁵² Campbell, O. Graham, W. *Strategies for reducing maternal mortality; getting on with what works.* *Lancet* (2006) 368, 1284-99

⁵³ Graham, WJ. (2001) Can *skilled attendance at delivery reduce maternal mortality*. In De Brouwere, V. Van Lerberghe, W. editors. *Safe motherhood strategies; a review of the evidence.* ITG Press. (2001), 70. 89-97.

A review of going to scale with maternal healthcare

Koblinsky et al (2006) reflects on going to scale with professional healthcare in a review paper⁵⁴. The researchers who cited a review of 40 nationally representative household surveys show a notable rise in doctor-assisted births, with most births accounted for in the public sector but a growing practice of women accessing private facilities. Despite the encouraging increase in access to maternal health services, Koblinsky reminds us that one in four women are without any obstetric care.

They indicate that the main obstacle to scale up of maternal health care is the scarcity of skilled health providers and weak health system infrastructure, substandard quality of care and women's reluctance to use maternal health services. Based on a meta analysis of findings from 40 household surveys representing 45% of the developing country populations, they extrapolate current practices and outcomes for reproductive and maternal health.

Some key findings include;

- Progress in maternal healthcare has been obstructed by stagnation in rural areas, mainly in sub-Saharan Africa
- Key contributing factors include poor quality of healthcare and lack of access by poor rural women to services
- Sustained healthcare during and after delivery relies on training, deployment and retention of health workers
- Teams of midwives and midwife assistants working in facilities will increase coverage by up to 40% by 2015.
- Addressing major gaps in safe motherhood requires political commitment.

In a review on human resources and access to maternal healthcare⁵⁵, the authors advocate for a major rethink on the issue of human resources and sharing of responsibility between the various cadres of health and community workers involved in support to maternal healthcare.

They shift the focus away from the immediate premise that lives are saved by direct intervention to that of the social and community and even wider to the political arena;

- High level of political commitment towards improving maternal health as evidenced in countries that have been successful in lowering MMR such as Sri Lanka, Egypt, and Malaysia.
- Investment in social and economic development including gender equality
- Strengthening health systems with emphasis on ensuring access and referral networks that do not imply major opportunity costs for women to access.
- An essential package of evidence based care including, family planning, safe abortion and comprehensive obstetric care.
- Full investment in human resources including a cadre of skilled midwives and birth attendants who can be present before, during and after birth.

All of the above elements are essential to combat the high maternal mortality rates and no single intervention can contribute to reduction in isolation.

⁵⁴ Koblinsky, M. et al (2006). Going to scale with professional skilled care. *Lancet* (2006) 368; 1377-86.

⁵⁵ Hoop Bender, T, McDonagh, S. (2006), Human resources and access to maternal healthcare. *Int J, Obs and Gynaecol.* 94; 226-223.

Interesting that more emphasis has been given to the presence of skilled birth attendants to meet the MDG5 than to many of the other equally critical components.

This may well be attributed (and rightly) to sound evidence from countries where notable reductions in maternal mortality have been achieved including. Some of the major factors that have contributed to such notable successes in these countries include;

- The presence and successful scale up of coverage of skilled birth attendants in Bolivia, China, Jamaica and Egypt and equally the existence of birthing facilities in all of these countries.
- The long standing legacy of professional midwifery in Sri Lanka which enabled a high ratio of skilled providers at village level and concomitant provision of functioning emergency obstetric facilities.
- A qualitative analysis of trained TBA interventions in Ghana, Mexico and Bangladesh found that community members were satisfied with the services of trained practitioners, that pregnant women preferentially consulted trained TBAs, and that mothers in program areas were more likely to take iron pills, seek immunizations, use oral rehydration solution, practice family planning, and improve their family's diet. In Ghana, HIS documented a reduction in still births, maternal deaths and neonatal deaths in regions where trained TBAs worked, however the program was also faced with challenges regarding TBA literacy levels and poor collaboration between TBAs and hospital based practitioners.
- In retrospect, many of the developed countries in the 19th century faced the same dilemma and overcame the high maternal mortality rates through professionalizing the delivery of care. Change of status of women in society and other confounding factor inevitably played a role in this context.

Section 5: Challenges to routine monitoring of maternal health interventions and evaluations of impact

New evidence is crucial if progress is to be made toward achieving ambitious targets of lowering maternal mortality (MDG5). Impact studies to measure maternal mortality are infrequent due to, costs, low level of feasibility and reliability of measures. The challenge of reliably measuring trends in maternal mortality is substantial as endorsed by Fillipi et al (2006)⁵⁶ in the Lancet review on tracking progress in maternal health. They advocate for using all opportunities to track data by adopting indirect approaches to complement the conventional data collection approaches including; innovations in sampling, sentinel surveillance and adjusted routine facility data.

So, based on this sound advice, what is feasible within a program context? The most commonly used measures to monitor maternal health programs include a range of outcome and process measures that are feasible within a national program context;

- 1 Total number of maternal deaths, by cause (ideally using verbal autopsy at household level)
- 2 Maternal mortality ratio, by cause (usually done with DHS or other national survey)
- 3 Midwife to population ratio
- 4 Availability of basic and comprehensive obstetric care facilities per 500,000 pop
- 5 Proportion of births attended by skilled health personnel by place of delivery
- 6 Proportion of births with caesarean section
- 7 Proportion of births with life saving surgery
- 8 Proportion of women who stayed in a health facility for 24h or more after a delivery.
- 9 Mortality rate among women of reproductive age. (usually done with DHS or other national survey)
- 10 Coverage by skilled birth attendants
- 11 Essential obstetric care availability
- 12 Provision of ante natal care
- 13 Quality of care indicators.

Assuming that most programs attempt to collect data in order to measure the above indicators, why are we faced with lack of reliable data and a poor evidence base on which to plan and manage programmes. The literature highlights some of the challenges in producing reliable measures for results for maternal health care interventions:

1. Maternal mortality as a single indicator does not assess progress; policy decisions need to be based on all determinants of maternal mortality (social, economic and cultural) as well as medical interventions. It is even more important to track progress towards instituting intrapartum care strategy and other interventions that are now known to avert maternal deaths. Monitoring of service use by equity parameters is also critical to understanding issues of access by the poor. It's well known that most of the women who die in childbirth have never visited a public health facility during the pregnancy.
2. Skilled attendance at delivery is one of the core indicators recommended by WHO and UNFPA as a routine indicator in all maternal

⁵⁶ Fillipi, V, et al (2006). Maternal health in poor countries; the broader context and a call for action. Lancet (2006) 368; 1535-41.

health programs. It is now a recommended indicator to track progress toward the MDG 5 for reduction of maternal mortality by 2/3 by 2015. The use of this indicator may be problematic as a proxy, as (i) definitions of “skilled” are employed where sub-standard quality and practices prevail and (ii) unless the (first level) skilled attendant is backed up by a functioning referral system, increased skilled attendance rates alone may not necessarily reflect a decreased risk on maternal death. (Van Lerberghe and De Brouwere, 2001)⁵⁷ Nevertheless, data on skilled attendance are relatively easy to obtain, and the indicator is considered one of the most useful for measuring project impact.

3. Other indicators commonly used in MH programming for performance monitoring include; # of health facilities providing (a) basic obstetric care and (b) comprehensive essential obstetric care based on the essential elements of obstetric care⁵⁸. Additional qualitative information can be obtained using HRH sources including type of trained personnel available per level of health facility. Campbell et al, (1997). This is frequently problematic in rural areas where the recommended norms for professionally trained health providers are rarely achievable and unskilled health workers or volunteers become the substitute with little or no supervision.
4. The caesarean section rate has also been proposed as a proxy for coverage and use of emergency services, a rate of less than 5% suggesting under-utilization. This indicator can potentially be extremely misleading, since a caesarean section does not always indicate an obstetric emergency. Concerns are raised over the perverse effect of conducting emergency caesarean sections where incentives are provided for emergency surgical procedures at referral hospitals.
5. ‘Met need’ for emergency obstetric care; the proportion of expected complicated deliveries in an area that accessed emergency obstetric care services. The expected number of complicated deliveries can be estimated using a standard ‘guesstimate’ of 15% of all deliveries in a geographic catchment area. Typically we have seen from the current literature, a reported range of obstetric emergency referrals from 0.5 – 5% in rural areas with limited access to functioning referral services.

Systemic problems to be addressed in maternal health programming

Much effort is targeting improvement of basic competencies of skilled birth attendants. However, training will only provide a part of the equation; provision of supplies including drugs, clean birth kits and infection control materials are essential in order for the skilled birth provider to delivery the correct standard of care. Additionally, maternal health initiatives cannot function in a vacuum and require integration with the wider health system, including logistic supply systems, planning and management systems and health information systems. The one component or one cadre type programs have been proven not to be effective as even the best trained providers cannot use their skills where equipment, supplies and information systems are not established and well functioning.

It has been suggested that in addition to technical indicators, quality of care indicators should include indicators on the appropriateness of the care delivery within the local cultural context, and the affordability and accessibility of health

⁵⁷ Graham, WJ. (2001) *Can skilled attendance at delivery reduce maternal mortality*. In De Brouwere, V. Van Lerberghe, W. editors. *Safe motherhood strategies; a review of the evidence*. ITG Press. (2001), 70. 89-97.

⁵⁸ WHO (2006). *Essential elements of obstetric care at first level of referral* (WHO Geneva)

care services. Since the latter indicators are more difficult to measure than the technical ones, it is tempting to mainly focus on the technical quality of care. However, it is questionable to what extent technical factors influence the outcome of care, if the other factors are not taken into account, since significant gaps can exist between the perceptions of service providers and those of the community regarding the quality of medical services provided⁵⁹.

Gaps in current maternal health research

Most evidence that exists in the field of maternal and newborn health is based primarily on retrospective survey designs, quasi experimental designs using randomized control trials and prospective qualitative studies combined with health facility data (see Annexe III for a review of selected study designs). Randomised control trials for assessment of TBA competencies are not readily used due to ethical considerations but have been used for comparisons of intervention and control area data to assess maternal health outcomes. Equally, competency assessment studies have avoided using direct clinical observation and prefer to adopt knowledge and skills tests using anatomical models in simulated home birth settings to assess birth attendants.

So, what is missing and what can we do better in future given that maternal mortality is in fact still very high in most developing countries. Given the range of findings and evidence (Annexe III) on which current policy and programming is based, there are some key interventions that require further research;

- i. There are few intervention studies and/or longitudinal studies that focus on home based deliveries and pregnancy and delivery outcomes. While there is a growing evidence base focused on facility based outcomes, there is limited research into the contribution of community based interventions for maternal health and sustained impact⁶⁰. Costello (2005) also highlighted the issue that community based interventions have been neglected and undervalued and advocates for large scale community studies. A number of prospective community based studies have been done, notably in Bangladesh and Indonesia⁶¹ using quasi experimental designs over a period of 12-24 months. Most of the evidence available however relies on retrospective evaluations of PHC interventions supported by NGOs or faith based organizations, or use of DHS and public health facility data to determine trends in behaviour change, referral and provider practices.
- ii. There are few robust assessments of the effect of birth preparedness packages implemented, though some NGOs have used them extensively as integral with community health based interventions e.g.; CARE in Bangladesh. Reservations were expressed in the literature that such birth preparedness plans may not have the desired effect due to lack of adequate referral services for emergency obstetric care. Examples are given of the increase of SBAs in Indonesia but such efforts were undermined by the concurrent drop in use of emergency obstetric service provision due to high out of pocket costs and low cultural acceptability. Studies therefore need to consider the correspondence between all levels of care when measuring effects of a single intervention such as the effects of SBA interventions on maternal health outcomes. The one component and one cadre approach is criticized with strong advocacy to move forward to a continuum of care approach that combines both

⁵⁹ Islam T (2000) *Building bridges between communities and services – experience of CARE-Bangladesh*; unpublished paper prepared for the MotherCare consultative forum

⁶⁰ Costello, A. et al (2004). Reducing maternal and neonatal mortality in the poorest communities. *BMJ* 2004; 329; 1166-8.

⁶¹ All the prospective studies using quasi experimental designs were supported by academic institutions including London School (Indonesia & Bangladesh studies), John Hopkins School (equity studies in Indonesia) with local institutions in country. Full references in abstracts and bibliography)

community and health facility packages. According to a paper by Graham et al (2001) they highlighted the need for studies showing the true impact of different professional mixes of attendants (doctors, nurses, midwives) on maternal health. They also propose use of a “Partnership Ratio” - the proportion of deliveries with a midwife and the proportion with a doctor—instead of percentage of deliveries with health professionals as a more useful independent variable.

- iii. There are few large scale assessments to show impact of comprehensive obstetric services with SBAs and referral to functioning health facilities. One of the most interesting and revealing studies is the The Matlab Bangladesh study cited in this review; Ronsmans et al (2005). Results revealed that efforts in the intervention area to scale up SBA coverage and the referral chain linked to emergency obstetric services yielded notable reductions in maternal mortality, but there was no significant difference between the maternal mortality reductions in the intervention area versus the comparison area where government services operated as normal. This raises the issue of determinants and attribution which we discussed in Section 3. To conclude, there are multiple confounding factors that influence the trends in maternal mortality, which again points to the need to broaden the impact and outcome measures to include a wider range of socio economic and cultural determinants to complement the commonly used health indicators.
- iv. More specifically in relation to referral pathways and outcomes of referral, the levels of care should be connected and made accountable according to a number of studies. Few studies have researched the effectiveness of referral pathways; and subsequent quality of referral interventions. Given the poor quality of care provided at many of the health facilities in developing countries this is a major issue. More substantive and longitudinal studies into barriers to access and outcomes of referral pathways are recommended. Equally counter referral is rarely mentioned in the literature as a factor for follow up on management of medical sequelae of complications.
- v. Other socio economic indicators (education, gender equality, livelihood opportunities) are shown to have a significant effect on the quality of life indices of women including improved survival rates during the reproductive years. More evidence based studies that focus on inequalities in access by the poorest women and how to overcome barriers in access are recommended by researchers.

Conclusion on current status of research on SBAs and maternal health outcomes

Based on the current literature, there a limited number of comprehensive studies in developing countries, that measure the performance of skilled birth attendants and explore the impact of their interventions on maternal health outcomes. Even fewer attend to the effectiveness of referral interventions according to a meta analysis of recent literature⁶². In Yemen specifically it was hoped to undertake a longitudinal study of the impact of scaling up coverage of community midwives from 2000 when the MOH decided to introduce this as a national strategy. To date there have been no longitudinal or comparative studies undertaken to assess the effectiveness and efficiency of this cadre of health workers and to evaluate their impact on maternal health outcomes.

This research review confirms that TBA training as a package of interventions has rarely been submitted to any kind of rigorous assessment in terms of

⁶² Murray, S. (2001) *Tools for monitoring the effectiveness of district referral health systems*. Health Policy Planning 85; 353-362.

outcomes. Among the many studies documented in the literature problems with sample size, study design, control or comparison groups, and statistical analysis are frequent. The impression overall is that many of the evaluations were not planned as an integral part of the programme design, but initiated as retrospective studies or accountability evaluations in the case of donor funded programs. Even evaluation of the TBA/SBA training process has not been as frequent or as rigorous as might be expected and is usually restricted to pre and post training assessments. Though more recently studies such as the URC QAP four country assessments of SBAs⁶³ has demonstrated new tools and assessment instruments that can be adopted by other country programs.

The following methods have been reported as the most common assessment and evaluative instruments and tools for program interventions;

1. **Traditional evaluative methods using** process (# of TBAs or SBAs trained, X volume of drugs provided, # of health facilities upgraded) and output indicators (No of deliveries at HFs assisted by SBA, utilization of MH services) while outcome indicators are limited to coverage indicators (ANC, TT and proportion of emergency obstetric referrals). As previously explained using project indicators as measures is useful only for the immediate intervention area and rarely addresses the wider issues such as, feasibility of scale up to include cost effectiveness, sustainability and implications for national policy.
2. **Use of clinical audit as a systematic method to evaluate the quality of care.** This method is well established in developed countries in medical institutions and is used in some developing country contexts. Clinical audit is a useful monitoring tool that can identify areas of substandard care that need to (and can be) improved and to implement the changes needed to meet agreed standards of care in facilities. Koblinsky et al (2006) highlights that the availability of substantive clinical audit data in developing countries is still limited. Health information management and audit skills are lacking particularly in the district level health facilities. So, resource investments in development of health information systems and human resource capacities is required if such tools are to be introduced and used reliably. Where audits were conducted (eg, Ghana, Nigeria) technical proficiency was shown to remain very low among skilled providers⁶⁴, with reports of unskilled attendants conducting unsupervised deliveries in over 33% of health facility births⁶⁵. Examples were given in Ghana and Nigeria where the majority of deliveries in referral hospitals were done by unskilled birth attendants with no supervision available.
3. **Use of competency based evaluations for SBAs** - The monitoring of sentinel skills (see annex II) to assess the SBA competencies has been found to be a most useful form of evaluation that is feasible and cost effective. The recommended approach advocates for competency based evaluations to ascertain the impact of both (a) quality of training of SBAs and (b) results or outcomes of interventions. Various methodologies have been developed by URC (QAP) for Benin, Rwanda, Jamaica, Ecuador and Nicaragua. This study assumes an entry point of PHC or referral level for all pregnant women and thus does not take into account the settings where women have zero access to any health facilities.
4. **Cost-effectiveness studies**, which should take account of impact in relation to use of limited resources and competing priorities, are virtually non-existent in the context of maternal health programming. More recently the BPHS package includes costings for basic obstetric care and emergency

⁶³ Harvey, S. et al (2007). Are skilled birth attendants really skilled: A measurement method, some disturbing results and way forward. Bulletin of the WHO. October 2007, 85(10), 733-820

⁶⁴ Hussein, J. et al (2004). *The skilled attendance index (SAI) proposal for a new measure of skilled attendance at delivery*. Reproductive Health Matters. (2004) 12; 160-70.

⁶⁵ Ibid.

obstetric care but there are still no models for costing of provision of care by skilled birth attendants in health facility and community levels. There are no follow up studies to compare the cost in provision of community based care with that of health facility based interventions for basic obstetric care.

5. **Quality of care studies and QA monitoring;** Few studies have looked at maternal health interventions in relation to overall health system strengthening and impact of training. Infrastructure and systemic problems are endemic in many of the developing country contexts with weak infrastructure, lack of supplies, and lack of drugs that hinder the operational capacities of SBAs. As identified in a number of studies, the competency of the SBA cannot be considered in isolation from the operational environment and enabling conditions that allow them work effectively, This introduces another variable which requires a more comprehensive approach to the study. Future studies need to account for the gaps and synergies that foster improved maternal health access and enabling environments for SBAs to function well.
6. **Demand for maternal health services;** while the Demographic and Health surveys determines the unmet need for essential health services, few studies explore where and with whom women would actually like to deliver. It is known that cultural and social barriers can serve as major barriers to accessing referral health care. Interventions aimed at breaking down barriers to respond to enhance the demand for services has included community level efforts to mobilize women's groups. Effectiveness interventions however are needed to explore the issue of women's perceptions of health care available both in the community and at health facility level.
7. **Skilled birth providers and job satisfaction;** While priority is given to exploring the issues of health worker competencies and delivery of services, the issue of intrinsic factors that influence the job satisfaction of the health worker also needs to be investigated and monitored. Such issues include, provider location and level of control over her work (home, health centre, hospital), responsibilities (basic versus life saving tasks), and team work. The level of supervision and mentoring plays a key role in the capacity of the provider. Issues such as infrastructure, staffing levels, policies, and regulations influence the behavior and job performance. Extrinsic factors including salary and bonuses if any, are major influencing factors that will also contribute to performance levels. Most of the human resource focused reviews highlight the need to investigate further to what extent intrinsic and extrinsic factors have an effect on the job performance and satisfaction levels. Additionally, a comparative study of facility based midwife performance versus that of a community based midwife would help in understanding more fully the challenges encountered in both environments.

Annex1: Bibliography

AbouZahr, C. et al (2001), Maternal mortality at the end of a decade; signs of progress. Bulletin of WHO. 79; 561-73.

Anwar, I. (2007). Inequity in maternal healthcare services; evidence from home based SBA programs in Bangladesh. Bulletin of WHO; V86 (4), 2007.

Barker, C. et al., 2007. Support to the Safe Motherhood Programme in Nepal: An Integrated Approach; <http://www.options.co.uk/options.com>

Blum, L.S. (2006) Performing home based deliveries by skilled birth attendants. Reproductive Health Matters. 14; 51-60.

Campbell O, Filippi V, Koblinsky M et al. (1997). *Lessons learnt – a decade of measuring the impact of Safe Motherhood programmes*; London School of Hygiene and Tropical Medicine

Carlough, M. and McCall, M. (2005). Skilled birth attendance: What does it mean and how can it be measured? A clinical skills assessment of maternal and child health workers in Nepal:

<http://www.figo.org/docs/AMDDPages0505-04.pdf>

Chowdhury, M.E. et al (2007) Determinants of reduction in MMR in Matlab, Bangladesh. Lancet 370; 1320-28

Costello, A. et al (2004). Reducing maternal and neonatal mortality in the poorest communities. British Medical Journal, 2004; 329; 1166-8.

DFID (2007). DFID's Maternal Health Strategy reducing maternal deaths: evidence and action second progress report; accessed at:

<http://www.dfid.gov.uk/pubs/files/maternal-health-progress-report.pdf>

Fillipi, V, et al (2006). Maternal health in poor countries; the broader context and a call for action. Lancet (2006) 368; 1535-41.

Freedman, L.P. et al (2007) Practical lessons learned from global safe motherhood initiatives; time for a new focus on implementation. Lancet 370; 1383-91.

Fullerton, J. (2007), Skilled Birth attendants at delivery. Review of evidence. Family Care International. New York.

Gerein N, Mayhew S, Lubben, M. (2003) A framework for a new approach to antenatal care; *International Journal of Gynecology and Obstetrics* 80: 175-182

Gill, K. et al (2007). Women deliver for development. Lancet (2007); 370; 1347-57.

Graham, W. Bell, JS. Bullough, W. Can skilled attendance reduce maternal mortality in developing countries? Stud HSO&P. 2001, 17 (97-129).

Harvey, S. et al (2007). Are skilled birth attendants really skilled; A measurement method, some disturbing results and way forward. Bulletin of the WHO. October 2007, 85(10), 733-820.

Hatt, L. Stanton, C. et al (2006). Did the strategy of skilled attendance at birth reach the poor in Indonesia. *Bulletin of WHO*, V85 (10) 2006.

Hill, K. Abou Zahr, C. on behalf of the Maternal Mortality Working group. Estimates of MMR worldwide between 1990 – 2005. *Lancet* (2007) 370; 1311-19.

Islam T (2000) *Building bridges between communities and services – experience of CARE-Bangladesh*; unpublished paper prepared for the MotherCare consultative forum

Jokhio, AH. (2005). An intervention involving TBAs and perinatal and maternal mortality. *N England J of Med.* 352; 2091-99.

Kamara, A. (1997) The international federation of gynecology and obstetrics; lessons learned from the PMM network experience. *Int J Gynecol Obstet.* V59 (Suppl 2) 253-258.

Kerber, K. et al (2007), Continuum of care for maternal, newborn and child health, from slogan to service delivery. *Lancet* 370; 1358-69.

Kolinsky M, Mathews Z, Hussein J, Malalanker D, Mridha MK, Anwar I, et al. Going to scale with professional skilled care. *Lancet* 2006; 368:1377-86.

Lawn, JE. (2006). Where is maternal and child health now? *Lancet* (2006). 368;1474-77.

Maine, D. (2007) Detours and shortcuts on the road to maternal mortality reduction.

Manandhar, DS. (2004) Effect of a participatory intervention with women's groups on birth outcomes in Nepal. *Lancet* 368;1248-53.

Muna L, Ross JL, et al. (2002). Failure to comply? Anthropological perspectives on refusal of emergency obstetric care in rural Bangladesh; in *Nurul Alam SM (ed) Contemporary anthropology – theory and practice; Dhaka: The University Press Limited*

Murray, S. (2001) Tools for monitoring the effectiveness of district referral health systems. *Health Policy Planning* 85; 353-362.

Pathmanathan, I. et al (2003). Investing in maternal health strategy; learning from Malaysia and Sri Lanka. H&P series. World Bank (2003).

Penny S, Murray SF. (2000). Training initiatives for essential obstetric care in developing countries: a 'state of the art' review; *Health Policy and Planning* 15(4): 386-393

RHO (2003) *Safe Motherhood*; Reproductive Health Outlook, online available at http://www.rho.org/html/safe_motherhood.htm

Ronsmans, C. et al (2004) Measuring the need for life saving obstetric surgery in developing countries. *Br J Obs Gyn* (2004); 111; 1024-30.

Sibley, L. et al (2004). What can a meta-analysis tell us about TBA training and pregnancy outcomes? *Midwifery.* V 20, 51-60.

Sibley, L. Sipe, T. Koblinsky, M. (2004) Does TBA training improve referral of women with obstetric complications? *Soc Sci Med*, 59; 1757-68.

Sibley, L. Sipe, T. (2006) Is there a future role for trained TBAs?. *J Health Popul Nutr*, 24(4); 472-478.
http://www.icddrb.org/images/jhpn24_4_Transition-to-Skilled.pdf

Stanton, C.K. (2006). Levels and trends in cesarean birth in the developing world. *Stud Fam Planning*. March (2006) 37; 41

Thaddeus S, Maine D (1994) *Too far to walk: maternal mortality in context; Social Science and Medicine* 38(8): 1091-1110

UNFPA, UNICEF and WHO (2003). Guidelines on monitoring the availability and use of obstetric services. New York.

UNFPA (2006). *Providing emergency obstetric care to all in need*; United Nations Population Fund: <http://www.unfpa.org/rh/mothers/obstetric.htm>

USAID (2008). Access to clinical and community maternal, neonatal and women's health services; <http://www.accesstohealth.org/wherework/cntryPrograms>

UNFPA (2004). Population issues: Safe Motherhood. Available at: http://www.unfpa.org/mothers/skilled_att.htm

Fauveau, V et al. (2008) Human Resources for Health: Multi-purpose of specialists. *Human Resources for Health* 2008, 6:21 (30 septemebr 2008)

Victoria, C.G. et al (2004) Evidence based public health; moving beyond randomized control trials. *Amer J Public Health*; 94; 400-05.

Villar, J. et al (2001) WHO antenatal care in preventing maternal mortality and serious morbidity. *Lancet* (2001) 357; 1551-64.

WHO/UNFPA/UNICEF/World Bank **1999** *Reduction of maternal mortality – a joint WHO/UNFPA/UNICEF/ World Bank statement*; Geneva: World Health Organization, online available at: http://www.who.int/reproductive-health/publications/reduction_of_maternal_mortality/e_rmm.pdf

WHO, UNFPA, UNICEF and World Bank, IMPAC; *Managing complications in pregnancy and childbirth; a guide for midwives and doctors*. Geneva WHO; 2000.

WHO (2006). Support to the Safe Motherhood Programme <http://www.who.int/pmnch/members/2006dfidreport.pdf>

WHO (1999). Reduction in maternal mortality: A joint WHO/UNFPA/UNICEF/World Bank statement.

WHO (2004) *Making pregnancy safe; critical role of skilled birth attendant*. WHO, ICM and FIGO. Geneva; WHO.

Annexe II: List of networks and related initiatives for maternal health

Access Resources⁶⁶ provides a full summary of all maternal health related initiatives. The key networks and related initiatives in progress are: (see annex ... for a more elaborate description).⁶⁷

- ***Averting Maternal Death and Disability (AMDD)*** program is coordinated by the Mailman School of Public Health, Columbia University. This is a global program of research, advocacy, policy analysis with extensive program support through operational research and technical advice for reduction in maternal mortality and morbidity. AMDD work in over 50 countries in Africa, Asia and Latin America, focusing on expansion of quality emergency obstetric care and addressing health system factors that constrain access and provision of services for maternal health.
- ***Integrated Management of Pregnancy and Childhood (IMPAC)***; is a global research initiative to strengthen the evidence base on effectiveness and cost effectiveness of intervention strategies for safe motherhood, coordinated by University of Aberdeen, UK. It's collaboration across a network of scientists in seven research institutions who have developed measurement methods for robust evaluation strategies.
- ***Skilled Care Initiative (SCI)*** is a 5 year program of the Family Care International that aims to increase availability, quality and accessibility of skilled maternity care in four rural districts of Burkina Faso, Kenya and Tanzania using a multifaceted approach to health facility and community interventions.
- The ***ACCESS program*** work to expand coverage, access and use of key maternal and neonatal services using a continuum of care approach from the household to hospital levels. The 5 year global program is sponsored by USAID and works with USAID missions, governments, NGOs and local communities.
- ***White Ribbon Alliance*** for Safe Motherhood is an international coalition of individuals and organizations formed to promote increased public awareness of the need to make pregnancy and childbirth safe for all women and newborns in the developing, as well as, developed countries. The White Ribbon Alliance represents an opportunity for new partnerships to work together to advance women's health and women's rights everywhere. Since its launch in 1999, the White Ribbon Alliance has been a leader among those holding governments and institutions to account for the tragedy of maternal mortality. With members in 91 countries and National Alliances established in 11 - Burkina Faso, Bangladesh, India, Indonesia, Malawi, Nepal, Pakistan, South Africa, Tanzania, Yemen and Zambia.

⁶⁶ Access (May 2007) provides a full list of resources for maternal and newborn care programming, See website: www.accesstohealth.org

⁶⁷ Cited in Freedman, L. et al (2007) Practical lessons from global safe motherhood.

Annex III: Abstracts on skilled attendance during pregnancy and delivery

Improving skilled attendance at delivery: a preliminary report of the SAFE Strategy Development Tool. *BIRTH*. 2003; 30(4):227–234. This article reviews field-testing of the Skilled Attendance for Everyone (SAFE) Strategy Development Tool in five developing countries. The tool is designed to help policy makers and planners systematically gather and interpret information to develop strategies for improving skilled attendance at birth. Use of the tool can be completed in three to five months at a cost of US\$12,938 to US\$15,627 at the district or subdistrict level. The information generated from this tool can be used to develop evidence-based strategies suited to specific countries and contexts.

Bergström S, Goodburn E. **The role of traditional birth attendants in the reduction of maternal mortality.** In: De Brouwere V, Van Lerberghe W, eds. *Safe Motherhood Strategies: A Review of the Evidence. Studies in Health Services Organisation and Policy*. 2001;17:1–450 . Available in English, French, and Spanish on CD-ROM by request to info@jsiuk. Traditional birth attendants (TBAs) play a significant role in offering cultural competence, consolation and psychosocial support to women during childbirth in many cultures. However, training of TBAs has had little impact on maternal mortality. The main benefits are improved referral and linkages with the formal health care system where essential obstetric care is available. Training TBAs should be given lower priority than training midwives, and developing essential obstetric care services and referral systems.

Bolam A et al. **Factors affecting home delivery in Kathmandu Valley, Nepal.** *Health Policy and Planning*. 1999;13(2):152–158. The goal of this study was to determine the factors influencing home delivery among women who have the choice of institutional or home delivery. The delivery patterns of 357 mothers were identified in a cross-sectional survey of two communities: urban Kalimati and a peri-urban area of Kirtipur and Panga. The main outcome measures were social and economic household details of pregnant women; pregnancy and obstetric details; place of delivery; delivery attendant; and reasons given for home delivery. Eighty one percent of the women had an institutional delivery and 19 percent delivered at home. Low maternal education level and multiparity were found to be significant risk factors for home delivery. Of the women who delivered at home, only 24 percent used a traditional birth attendant (TBA), and over 50 percent of deliveries were unplanned due to precipitate labor or lack of support. The authors conclude that, rather than poverty, poor education and multiparity increase the risk of a home delivery in the study setting. Training TBAs in this setting probably would not be cost-effective. They suggest that community-based delivery units run by midwives could reduce the incidence of unplanned home deliveries.

Buffington S et al. **Life Saving Skills Manual for Midwives.** 3rd ed. Washington, DC : American College of Nurse-Midwives; 1998. The Life Saving Skills Training Program for midwives, developed and implemented by the American College of Nurse Midwives, is a competency-based training program that equips midwives with the skills to intervene in the five life-threatening complications that cause most maternal deaths: obstetric hemorrhage, obstructed labor, obstetric sepsis, hypertensive disorders of pregnancy, and complications of unsafe abortion.

de Bernis L et al. **Skilled attendants for pregnancy, childbirth and postnatal care.** *British Medical Bulletin.* 2003;67:39–57. Providing skilled care at delivery makes clinical sense, is desired by women, and is both cost-effective and feasible in developing countries according to this article. While randomized controlled trials are not ethically possible, the authors provide evidence showing the benefits of skilled attendants. A skilled attendant must work in close collaboration with other obstetric care and lay providers. Health providers can advocate for skilled attendants, take part in research, and upgrade skills. Creating effective systems to deal with obstetric emergencies will benefit the entire health care system.

de Bernis L et al. **Maternal morbidity and mortality in two different populations of Senegal: a prospective study (MOMA survey).** *British Journal of Obstetrics and Gynaecology.* 2000;107(1):68–74. This prospective population-based study followed 3,777 Senegalese women throughout pregnancy, delivery, and postpartum. It compared the levels of maternal morbidity and mortality between the urban Saint-Louis and Kaolack areas. Maternal mortality was found to be higher in the Kaolack area, where women gave birth primarily in district health centers, assisted by traditional birth attendants (874 versus 151 deaths per 100,000 live births). In Saint-Louis most women giving birth in health facilities went to the regional hospital and were assisted by midwives. Morbidity, however, was greater in Saint-Louis than in Kaolack, especially for women delivering in health facilities (9.50 versus 4.84 episodes of obstetric complications per 100 live births). Analysis of these findings showed that morbidity was associated with the training of the birth attendant, and antenatal care had no effect. The authors suggest that employing the most qualified personnel possible for monitoring labor in health facilities will have the greatest impact on maternal mortality.

Fauveau V et al. **Effect on mortality of community-based maternity-care programme in rural Bangladesh.** *Lancet.* 1991;338:1183–1186. This article evaluates the impact of the Matlab community-based maternity care program which posted trained midwives in villages. Midwives in the program area visited 44 percent of all pregnant women at least once, were present at 13 percent of deliveries, and referred one-fifth of the women they delivered to the clinic. Women were reluctant to call on the midwives to attend births because the distance was too great and/or because they had no complications. After the program had been in place for three years, the maternal mortality ratio due to obstetric complications was far lower in the program area than in a comparison area (1.4 versus 3.8 deaths per 1,000 live births). The authors conclude that posting trained and well-equipped midwives at the village level, who have access to an effective chain of referral, can improve maternal survival.

Goldman N, Gleit D. **Evaluation of midwifery care: results from a survey in rural Guatemala.** *Social Science & Medicine.* 2003;56:685–700. In this analysis of data from the 1995 Guatemalan Survey of Family Health, training of midwives had little effect on the quality of midwife care. The study examined the extent to which women used both traditional and biomedical pregnancy care, how frequently midwives refer women to biomedical providers, the content and quality of care offered by midwives, and the effects of midwife training programs on referral and quality of care. Trained midwives were more likely than other midwives to refer clients to biomedical providers (although they did so irregularly), but most pregnant women do not see biomedical providers. The reasons for this are outside the scope of this study, but may relate to the reported poor treatment women receive at government health facilities.

Goodburn E. et al. **Training traditional birth attendants in clean delivery does not prevent postpartum infection.** *Health Policy and Planning*. 2000;15(4):394–399.

This study in rural Bangladesh found that trained TBAs are significantly more likely to practice hygienic delivery than untrained TBAs, but hygienic birth practices do not prevent postpartum infection. Data on 800 women were reviewed, including antenatal and three postpartum interviews. The cases were analyzed to assess the proportion of cases with infection and the effect of a trained TBA's presence at delivery. TBAs trained in the "three cleans" were more than twice as likely (45%) as the untrained TBAs (19%) to perform "clean" deliveries. However, there was no significant difference found in the levels of postpartum infection in the two groups. Logistic regression analysis found the TBA training and hygienic delivery had no independent effect on postpartum outcome. Pre-existing reproductive tract infection, long labor, and insertion of hands into the vagina were found to have a significant effect. More rigorous evaluation of TBA training, and its individual components, is needed to determine how they can influence postpartum infection and maternal morbidity.

Graham W et al. **Can skilled attendance at delivery reduce maternal mortality in developing countries?** In: De Brouwere V, Van Lerberghe W, eds. *Safe Motherhood Strategies: a Review of the Evidence. Studies in Health Services Organisation and Policy*. 2001;17:1–450. Available in English, French and Spanish on CD-ROM by request to info@jsiuk.

This paper explores the scientific justification for the goal of skilled attendance at all deliveries. It reviews the historical and epidemiological evidence, pointing out inconsistencies in the link between maternal mortality and skilled attendants. The article provides definitions of minimum and additional skills for skilled attendants. The authors propose that the term "skilled attendance" encompass a partnership of skilled attendants and an enabling environment of equipment, supplies, drugs, and transport for obstetric referral. An empirical model for the effect of skilled attendance on maternal health is included. However, there is a need for studies showing the true impact of different professional mixes of attendants (doctors, nurses, midwives) on maternal health. The authors also propose use of a "Partnership Ratio" - the proportion of deliveries with a midwife and the proportion with a doctor—instead of percentage of deliveries with health professionals as a more useful independent variable.

Hoff W. **Traditional health practitioners as primary health care workers.** *Tropical Doctor*. 1997; 27(Suppl.):52–55.

This article evaluates the effectiveness of programs in Ghana, Mexico, and Bangladesh that trained TBAs and other traditional health practitioners to provide primary health care services. A qualitative analysis found that community members were satisfied with the services of trained practitioners, that pregnant women preferentially consulted trained TBAs, and that mothers in program areas were more likely to take iron pills, seek immunizations, use oral rehydration solution, practice family planning, and improve their family's diet. In Ghana, statistical records documented a reduction in still births, maternal deaths, and neonatal deaths in regions where trained TBAs worked. The programs faced two obstacles: low literacy levels among traditional practitioners and poor collaboration between traditional practitioners and hospital physicians.

Kamal IT. **The traditional birth attendant: a reality and a challenge.** *International Journal of Gynecology & Obstetrics*. 1998;63(Suppl.1):S43–S52.

Traditional birth attendants (TBAs) are a familiar part of the birthing process worldwide. They provide a much-needed service in many communities, but the quality of the care they provide often needs improvement. Many safe motherhood programs in developing countries have worked with TBAs to improve their skills and the care they provide. A review of TBA training and use in more than 70 countries over the past three decades shows there has been some success. However, once the TBA completes her training she is often left to practice with little supervision and support, and the care she provides is compromised. To make effective use of this human resource, programs need to improve TBA training curricula and better prepare the trainers; provide supervision of the TBAs post-training; ensure accessibility of emergency obstetric care; and help TBAs publicize their improved skills and receive compensation for their services. In the long term, national health plans should work to replace TBAs with a better-trained alternative which is acceptable, accessible, and affordable.

Macleán G. **The challenge of preparing and enabling 'skilled attendants' to promote safer childbirth.** *Midwifery*. 2003;19:163–169

A review of historical and epidemiological evidence highlights the importance of what the author calls "The Three Es" of skilled attendance at birth: the Education of the skilled attendant, the Environment in which s/he practices, and the Effectiveness of the skilled attendant. For a skilled attendant to be effective, s/he must have the necessary skills and work in an enabling environment. The latter is crucial, and depends on political support, effective systems of communication and transport, and available equipment and supplies.

Maimbolwa M et al. **Cultural childbirth practices and beliefs in Zambia.** *Issues and Innovations in Nursing Practice*. 2003;43(3):263–274.

This study explored childbirth practices and beliefs in urban and rural Zambia. Interviews with 36 women accompanying laboring women to maternity units showed that half considered themselves to be mbusas or traditional birth assistants. These women advised laboring women on use of traditional medicines. They relied on traditional beliefs and witchcraft to explain complications. These social support women lacked understanding of causes of obstetric complications and appropriate management of labor and delivery. Their cultural knowledge, however, could be used to guide the development of safe motherhood programs, and one-third of the women were in favor of learning about childbirth care from midwives.

Minden M, Levitt MJ. **The right to know: women and their traditional birth attendants.** In: Murray SF, ed. *Midwives and Safer Motherhood*. London: Mosby; 1996.

This article reviews the debate over the proper role of TBAs. It differentiates between a crisis management perspective (which emphasizes TBA referrals to medical centers) and a community-health development perspective (which views TBAs as facilitating the natural process of childbirth and fostering women's well-being). The authors argue for a broader role for the TBA, including advising pregnant women on proper nutrition and hygiene, using preventive practices during delivery, managing certain limited complications, making referrals and acting as an agent of change and role model for other women. The article presents a broad framework for assessing trained TBAs that include utilization and quality of their services, changes in community practices, maternal and neonatal deaths averted, and referrals made.

Paul B and Rumsey D. **Utilization of health facilities and trained birth attendants for childbirth in rural Bangladesh: an empirical study.** *Social Science & Medicine*. 2002;54:1755–1765.

This retrospective study analyzed factors associated with the use of modern health care among couples experiencing childbirth during 1995–1997 in 39 villages in rural Bangladesh. About 11 percent of deliveries were attended by trained personnel, and the rest were attended by traditional birth attendants (TBAs). Multivariate analysis shows that delivery complications were the most important factor determining use of modern health care resources for childbirth, followed by parental education and prenatal care. The authors conclude that training TBAs and community members to respond quickly to delivery complications, along with improving access to hospitals and trained TBAs can reduce the risks of infant and maternal morbidity and mortality in rural Bangladesh.

Ray AM, Salihu HM. **The impact of maternal mortality interventions using traditional birth attendants and village midwives.** *Journal of Obstetrics and Gynaecology*. 2004;24(1):5–11.

A literature search from 1966 through February 2003 identified 15 maternal mortality intervention studies using traditional birth attendants (TBAs) and midwives. Five of the five programs using maternal mortality as an outcome measure showed a decline in maternal mortality ratios; two of three studies measuring morbidity-related indicators showed some improvement; six of seven showed improved referral rates, and three of three found high levels of knowledge retention among trained TBAs. Programs having the greatest impact used TBAs and village midwives in multisectoral activities. More research is needed, especially to establish a causal association between TBA training and maternal mortality decline.

Ronsmans C. et al. **Evaluation of a comprehensive home-based midwifery programme in South Kalimantan, Indonesia.** *Tropical Medicine and International Health*. 2001;6(10):799–810.

Training, deploying, and supervising professional midwives in villages in South Kalimantan, Indonesia, resulted in a large increase in the proportion of births attended by a skilled provider, but had little impact on providing specialized obstetric care for all women. Working with the Indonesian government, in 1994 MotherCare initiated in-service training of midwives; a supervisory system; a maternal and perinatal audit; and an information, education, and communication strategy aimed at the community. These activities increased the proportion of births attended by a skilled provider (at home or in a facility) from 37 percent to 59 percent. The program also doubled the proportion of women receiving postpartum visits (36% to 72%). Despite these improvements, the proportion of women admitted to the hospital for a cesarean section declined from 1.7 to 1.4 percent. The proportions admitted to the hospital for life-saving treatment of a complication dropped from 1.1 percent to 0.7 percent. These data indicate an increasing unmet need for obstetric care. The reasons for this most likely include lack of transportation, cultural aversion to use of health care facilities for obstetric care, and the high cost of emergency obstetric care. The government is challenged to sustain the extensive village midwifery program, and to find ways to increase access to specialized obstetrical care for those in need.

Safe Motherhood Inter-Agency Group. **Skilled Care During Childbirth: A Review of the Evidence.** New York: Family Care International;2003.

This review uses published and unpublished literature, country reports, and interviews with technical specialists to examine the relationship between skilled care and maternal mortality reduction.

Senah KA et al. **From abandoned warehouse to life-saving facility, Pakro, Ghana.** *International Journal of Gynecology & Obstetrics.* 1997;59(Suppl. 2):S91–S97.

Creating a village health post staffed by a midwife improved access to maternal health care in a rural area of Ghana. Other interventions included training the midwife in life saving skills, training TBAs to refer women with complications, placing new equipment in the district hospital, and educating the community and the drivers' union on the need for prompt medical attention in case of obstetric emergencies. Over a 43-month period, the midwife attended 702 antenatal clients, delivered 86 women, and made 20 referrals. The midwife was able to treat all minor and some major complications. Access remained a problem because the health post was not open 24 hours a day and some communities were located far from the post.

Sibley L and Armbruster D. **Obstetric first aid in the community—partners in safe motherhood: a strategy for reducing maternal mortality.** *Journal of Nurse-Midwifery.* 1997;42(2):117–121.

This article describes a new initiative of the American College of Nurse-Midwives (ACNM) to train community members in obstetric first aid. Obstetric first aid includes actions that prevent complications, the prompt recognition of complications, safe and effective responses to complications, and arrangements to improve access to referral facilities. ACNM has developed and is planning to field test two performance-based training programs on obstetric first aid: one is designed for TBAs, while the other is directed to women and their families.

Sibley LM, Sipe TA, Koblinsky M. **Does traditional birth attendant training increase use of antenatal care? A review of the evidence.** *Journal of Midwifery and Women's Health.* 2004;49(4):298–305

Narrative and meta-analytic studies of published and unpublished studies between 1970 and 2002 were reviewed to assess the relationship between traditional birth attendant (TBA) training and increased use of antenatal care. Fifteen studies from eight countries in two world regions were included. There are varying positive associations between TBA training and TBA knowledge of the value and timing of antenatal care, and on TBAs offering advice or assistance for antenatal care and compliance and use of antenatal care by their patients. There is little information on the characteristics of TBA training programs. Although no causal association can be made, results suggest that TBA training may increase antenatal care attendance rates by 38 percent. This could contribute to reductions in maternal morbidity and mortality in areas offering quality antenatal and obstetric care services. Better studies on the effect of TBA training and other factors influencing use of antenatal care are needed.

Voet W. [Using Performance and Quality Improvement to Strengthen Skilled Attendance.](http://www.mnh.jhpiego.org/resources/usingPOI.pdf) Baltimore: JHPEIGO, Maternal and Neonatal Health Program; 2003. Available at: www.mnh.jhpiego.org/resources/usingPOI.pdf.

This report of the Maternal and Neonatal Health Program shows how using performance and quality improvement (PQI) techniques can be used to help health facilities review and monitor skilled attendance at childbirth. It provides

lessons learned in MNH programs in Burkina Faso, Guatemala, Honduras, Indonesia, and Tanzania.

Abstract: An intervention involving traditional birth attendants and perinatal and maternal mortality in Pakistan

Abdul Hakeem Jokhio, M.B., B.S., Ph.D., Heather R. Winter, M.D., M.R.C.O.G., and Kar Keung Cheng, M.B., B.S., Ph.D.

N Engl J Med 2005; 352(20):2091-9.

[Full text available online on the North England Medical Journal site](#)

Background: There are approximately 4 million neonatal deaths and half a million maternal deaths worldwide each year. There is limited evidence from clinical trials to guide the development of effective maternity services in developing countries.

Methods: We performed a cluster-randomized, controlled trial involving seven subdistricts (talukas) of a rural district in Pakistan. In three talukas randomly assigned to the intervention group, traditional birth attendants were trained and issued disposable delivery kits; Lady Health Workers linked traditional birth attendants with established services and documented processes and outcomes; and obstetrical teams provided outreach clinics for antenatal care. Women in the four control talukas received usual care. The primary outcome measures were perinatal and maternal mortality.

Results: Of the estimated number of eligible women in the seven talukas, 10,114 (84.3 percent) were recruited in the three intervention talukas, and 9443 (78.7 percent) in the four control talukas. In the intervention group, 9184 women (90.8 percent) received antenatal care by trained traditional birth attendants, 1634 women (16.2 percent) were seen antenatally at least once by the obstetrical teams, and 8172 safe-delivery kits were used. As compared with the control talukas, the intervention talukas had a cluster-adjusted odds ratio for perinatal death of 0.70 (95 percent confidence interval, 0.59 to 0.82) and for maternal mortality of 0.74 (95 percent confidence interval, 0.45 to 1.23).

Conclusions: Training traditional birth attendants and integrating them into an improved health care system were achievable and effective in reducing perinatal mortality. This model could result in large improvements in perinatal and maternal health in developing countries.

- i. **Abstract;** Safe motherhood studies; results from Jamaica. Competency of skilled birth attendants. The enabling environment for skilled attendance at delivery. In-hospital delays in obstetric care (documenting the third delay).

Harvey, S.A. McCaw Binns, A. Sandino, I. Urbina, L. Rodriguez, C.

Bulletin of the WHO. October 2007, 85(10), 733-820

The assistance of a skilled birth attendant during labor, delivery, and the immediate postpartum period is one important component of quality obstetric (OB) care. Other key factors are an enabling environment for skilled attendance at delivery and prompt attention at a medical facility for women arriving with an OB complication. However, little is known about the competence of skilled birth attendants (SBAs), the elements that contribute to an enabling environment, and the causes of what is commonly known as the "third delay": the delay in receiving medical attention after a woman with an OB complication arrives at a healthcare facility.

This report presents the results from Jamaica based on a quality assurance project conducted as part of a four country research study by URC QAP.

The **Competency Study** measured knowledge with a 55-question test covering six subject areas. It also tested skills in several key areas, including neonatal resuscitation, manual removal of placenta, bimanual uterine compression, and insertion of an intravenous needle. It also asked participants to assess their own ability to carry out common obstetric procedures. The knowledge and skills tests were completed by providers from the four hospitals in the study plus a representative sample of community-based midwives.

Results yielded a mean score of only 58% correct for the knowledge test and 46% on the skills test. Hospital-based provider scores were higher than the community-based providers in both tests, in all topics except asepsis in the knowledge test and mouth-to-mouth and resuscitation in the skills test, which were slightly higher in the community-based group. Knowledge scores related to pregnancy-induced hypertension were higher for both hospital-based and community-based providers than for any other topic.

Community-based providers' knowledge about sepsis and active management of third stage labor was low. In the skills test, *manual removal of placenta and bimanual uterine compression mean scores were low for all types of providers—only about 38% for hospital-based and 14% for community-based providers.* There was little correlation between providers' self-assessment and their competency as measured by the knowledge and skills tests.

The **Enabling Environment Study** addressed the contribution of enabling factors and essential elements to health worker performance. The researchers used an *observation checklist* to evaluate performance during labor, delivery, and the immediate postpartum period and reviewed medical records to evaluate performance in managing OB complications. They surveyed providers in each facility about supervision, training, and motivation, and, inventoried the availability of essential drugs, equipment, and supplies in each study hospital. Labor monitoring, including checking fetal heart rate and the mother's blood pressure, was inadequate in most observed cases.

Results demonstrated that key tasks for intrapartum and postpartum care for the mother were performed adequately in most observed cases, although use of sterile drapes and clothing was done in far less than half the cases. Most administered oxytocin to the mother after delivery. However, some key tasks for postpartum care for the newborn in the first two hours after birth were frequently not done, including suctioning, putting the baby into skin-to-skin contact with the mother, checking baby's temperature, checking the umbilical cord, and keeping baby under constant supervision

The **Third Delay Study** used direct observation to analyze patient flow in all four study hospitals. In addition, three physicians reviewed medical records to identify any delays at different points in patient care: *Most of the delays they found occurred during diagnosis, especially for obstructed labor.* For women who were not in labor, waiting times after arrival at the OB department to initial exam averaged 19 minutes, and to exam by a professional averaged 43 minutes, although these times differed substantially by hospital. Waits were significantly longer on weekdays than weekends at all hospitals, but whether wait times were different during the day or night differed by hospital. Delays in treatment were documented for all types of emergencies, with many resulting from delays in C-sections, which average 102 minutes from order to beginning of surgery. Sepsis was the emergency with the longest time from order to its administration: 205 minutes on average.

Annex IV: Review of intervention studies for maternal health. *Canavan, A. (2008)*

Study/Location and Year	Study design & methodologies	Results/Findings	Comments by reviewer
<p><i>Gloyd, S. et al (2001). Impact of TBA training in Mozambique; A controlled study</i> Journal of Midwifery & Women's Health. Vol 46; No 4; July/August 2001.</p>	<p>This study was designed to assess the utility and impact of perinatal mortality based on a TBA training program in Mozambique. It compares birth attendance and outcomes in similar communities with and without trained TBAs;</p> <ul style="list-style-type: none"> i. Communities with good access to TBAs across 40 rural health zones where 56 TBAs resided, and > 15km from health facilities. i. Randomly selected, comparable communities in 25 health zones, with no access to TBAs, >15km from HFs. i. Communities across all 9 districts in the target area, with good access to functioning health facilities with trained midwives. <p>Methods/Tools used with convenience sampling through house visits, with 60 women per health zone were interviewed;</p> <ul style="list-style-type: none"> i. Interviews with women in households close to the home of TBAs, with a total of 4169 women interviewed (3,616) reported pregnancies which resulted in a death. ii. A 48 page Questionnaire was developed and tested during a 3 week pilot period. MMR was assessed using the "sisterhood method" where survivors are asked about the death of their sisters. ii. Eight study teams with 2 	<p>Of a total of 4169 women interviewed, who reported on a total of 3616 pregnancies; no sig differences in mean age, parity and education level across the two groups. Women in Group 3 however had higher educational levels.</p> <p>Group 1 women reported least facility births (43%) with 33% attended at home by TBAs. Group 2 births had 58% of facility deliveries with Group 3 reporting 77% of facility births.</p> <p>Group 1 reported only 21% ANC while all women with >4 years education were more likely to deliver at a health facility.</p> <p>Perinatal mortality was reported as; Group 1; 59/1000 Group 2; 59/1000 Group 3; 72/1000</p> <p>The MMR was 400/100,000 live births and no significant differences across groups reported. So TBA training does not demonstrate any difference in maternal mortality. This is one of only a few studies that use a control to measure the effects of TBA training on MMR. Reporting error and potential response bias were noted as limitations. Perinatal and infant deaths were likely to be underreported, consistent with many studies that use the direct reporting method to determine mortality.</p> <p>Differences in enabling conditions for TBAs</p>	<p><i>This is one of a small number of studies conducted that use a control to assess TBA intervention on maternal and neonatal health outcomes. Three TBA evaluation studies reported reductions in maternal mortality but attribution of causality comes into question in the absence of a comparison group. Only one other control study in Ghana showed no reduction in MM associated with TBA training where Graham et al (1990) used the sisterhood method to determine maternal mortality in intervention areas (and non) for skilled birth attendant and untrained TBA comparisons. .</i></p>

Annex IV: Review of intervention studies for maternal health. <i>Canavan, A. (2008)</i>			
Study/Location and Year	Study design & methodologies	Results/Findings	Comments by reviewer
	interviewers per team were trained in sampling, interview skills, mostly midwives.	(trained and un-trained) were not great enough to significantly reduce perinatal mortality. Strategies should include a range of options for women and equally ensure adequate training for TBAs.	
<i>Goldman, N. et al (2003). Evaluation of midwifery; results from a survey in Guatemala;</i> Goldman, N. Dana, A.G. (2003) Social Science & Medicine 56; (2003); 685-700.	An evaluation in Guatemala that focuses on integration of traditional and biomedical maternal care; Authors used a Retrospective study approach, extrapolated secondary data from the Guatemalan Survey of Family Health (1995). The data was disaggregated for areas with trained and non-trained providers, emergency referral rates and quality of care.	Trained providers are more likely to refer women to biomedical providers; most pregnant women do not attend a health facility. Quality of midwifery care is similar for both trained and untrained providers.	<i>Extensive disaggregation of secondary data including, characteristics of providers, cost of care provided, treatment and practices provide by midwives. Quality of care indices are classified as beneficial or harmful.</i> <i>* This is a retrospective study relying on established national level data. May not be suitable to Yemen context due to paucity of data.</i>
<i>Blum, L. et al (2006). Attending home versus Clinic based deliveries; perspectives of SBAs in Matlab, Bangladesh.</i> Blum, L. Sharmin, T and Rosmans, C. Reproductive health matters. (2006); 14(27); 51-60.	Qualitative research study (Sept 2003-June 2004) was carried out to examine feasibility of home versus facility based deliveries; Using; i. Indepth interviews with SBAs (total of 4 per SBA) over the study period. ii. Focus group discussions as the cohort was divided into six groups x 8 providers per group. iii. Observation and use of anecdotal evidence to triangulate was also undertaken.	Findings illuminate major constraints during home deliveries; Inadequate transport Inappropriate environment for delivery Insufficient supplies Lack of security Inadequate training and supervision Attention to cultural, practical and medical issues are explored further. Health facility births although more efficient were not as culturally accepted by women	Findings suggest that training specific to home based delivery is vital with adequate supervision by trained medical providers. <i>* this methodology is feasible and low cost to conduct and could be integrated into the MNH program – with supervision by senior health facility & governorate staff.</i> <i>Were home deliveries attended by SBAs? What skill level and what were the conditions for referral?</i>

Annex IV: Review of intervention studies for maternal health. *Canavan, A. (2008)*

Study/Location and Year	Study design & methodologies	Results/Findings	Comments by reviewer
		<p>Agree that an enabling environment is of equal importance to skill levels and efficient referral is critical to life saving for complicated deliveries.</p>	
<p><i>Bimal, K. (2002). Utilization of health facilities and trained TBAs for childbirth in rural Bangladesh. An empirical study.</i> Bimal, K.P. Rumsey, J.D. (2002). <i>Social Science & Med.</i> 54 (2002); 1755 – 1765.</p>	<p>Study focuses on factors associated with utilization of modern health facilities in 39 villages in Bangladesh.</p> <p>Authors used a retrospective study design to collect data from couples who experienced childbirth (2 year recall period 1995-97) Pop 40,107.</p> <p>(Authors were native to the area) – so had access to all sources of information and revisits to all villages. Sample size – 2334 couples using a questionnaire (9 independent variables) and included demographic, economic and social information. MMR information was not collected due to unreliability of survey design for the purpose.</p>	<p>With a short reference/recall period, reliability of the data proved high.</p> <p>A total of 11% of deliveries were attended by a trained provider and 86% by TBAs. Out of this total 34% were referred to a trained provider.</p> <p>20% of women had received ANC of those attended by trained providers compared to 8% of those by TBAs.</p> <p>Major determinants for use of medically trained providers includes, education, distance from health facilities.</p>	<p><i>This study was conducted over a 2 year period – using retrospective analysis of household level information via interview method.</i></p> <p><i>* Retrospective studies using recall methods are useful to access information related to wider determinants of MH outcomes. The cohort of couples (men and women) also allow multiple perspectives. However, this approach is costly and labour intensive, requiring use of questionnaires by trained interviewers with a large sample size. Does not yield adequate findings related to performance of SBAs and competency levels. Would need to be complemented by competency based assessments for this purpose.</i></p>
<p><i>Goodburn, E. et al (2000). Training TBAs in clean delivery does not prevent post partum infection.</i> <i>Health Policy and Planning;</i> 15(4); 394-399.</p>	<p>Prospective study in rural Bangladesh recruited pregnant women over an 18 month period. Data on delivery and post partum was collected within 1-4weeks following delivery by lay health workers who interviewed and did a brief physical exam. Self</p>	<p>Trained TBAs were significantly more like to practice hygienic delivery than untrained TBAs. (45% vs 19%) with no sig differences in post partum infection outcomes if trained TBA interventions vs untrained TBAs.</p>	<p><i>Specific single intervention study with a longitudinal approach 18 months) which is very useful for exploring specific MH outcomes, health seeking behavior and relationship with provider behavior. This could be</i></p>

Annex IV: Review of intervention studies for maternal health. *Canavan, A. (2008)*

Study/Location and Year	Study design & methodologies	Results/Findings	Comments by reviewer
	<p>reported symptoms were recorded using a classification for diagnosis of infection.</p> <p>A total of 2099 pregnant women were sampled with a total of 800 women in the final sample who delivered at home by a trained TBA included in the analysis.</p> <p>The hygienic practices of the TBAs were explored while the key outcome measure was genital tract infection of post partum women.</p>	<p>Other co-existing factors were influential- pre-existing infections; long labor and insertion of hands into the vagina were all significant causes of genital tract infection. Absence of association between training and occurrence of infections is noteworthy.</p>	<p><i>scaled up to include both clinical and social behaviors of TBAs and perceptions by the client.</i></p> <p><i>Using SSQs, its feasible to determine the routines, barriers encountered (based on 3 delay model) and levels of satisfaction by the family.</i></p>
<p><i>de Bernis et al (2000) Maternal morbidity in 2 populations of Senegal; a prospective study. MOMA survey.</i></p> <p>British Journal of Obs & Gynae; 2000; 107(1); 68-74.</p>	<p>A prospective population based study was conducted of 3,777 women; through pregnancy, delivery and post partum to compare levels of maternal morbidity and mortality between 2 urban areas in Senegal. This study was conducted over 24 months.</p>	<p>Maternal mortality was higher in Kaolack area where women gave birth in district health centers, assisted by traditional TBAs (874 per 100,000 live births) – compared to St Louis where women gave birth assisted by trained midwives or in the regional hospital with (151 per 100,000 live births).</p> <p>Morbidity was greater in St Louis, for women delivering in health facilities. (9.5 episodes vs 4.84 per 100 live births). Morbidity was found to be associated with the level of training of birth attendants and quality of care indices.</p>	<p><i>*This study is prospective for facility based deliveries. Interesting comparisons are made between unskilled and skilled care provision. This study can only be replicated if a comparative analysis with community based care versus health facility care is under review; not relevant for only home based delivery approaches.</i></p>
<p>Ronsmans, C. et al (2001). <i>Evaluation of a comprehensive midwifery program in South Kalimantan. Indonesia.</i></p>	<p>Mothercare Services (NGO) supported the Indonesian MOH to strengthen maternal health services in South Kalimantan in early –mid 1990s. It</p>	<p>A program evaluation was conducted which showed an increase from 37% to 59% of births assisted by a skilled provider.</p>	<p><i>* This proved to be a useful and timely program evaluation that coincided with major changes in the Indonesian health policy (priority to</i></p>

Annex IV: Review of intervention studies for maternal health. *Canavan, A. (2008)*

Study/Location and Year	Study design & methodologies	Results/Findings	Comments by reviewer
Tropical Medicine and Int Health. 2001;6(10); 799-810.	included training of midwives, inservice supervision and a maternal and perinatal audit. An information, communication and education strategy was also developed.	Doubling of post partum care (36% - 72%) was remarkable in the same period. Proportion of women admitted for cesarean dropped from 1.7 to 1.4 – this was attributed to the increased cost of hospital services and cost of transportation.	<p><i>MH and skilled providers) with a concurrent down turn in local economies which impoverished already poor families; this is seen here regarding poor access to emergency hospital services.</i></p> <p><i>Useful evaluative study to determine the contribution of SBAs in the community but also to highlight the importance of critical links to referral services.</i></p>
<p><i>Jokhio, A.H. et al (2005). An intervention involving traditional birth attendants and perinatal and maternal mortality in Pakistan</i> New England J of Med (2005). 352(20) 2091-99.</p>	<p>A cluster-randomized, controlled trial involving seven subdistricts (talukas) of a rural district in Pakistan. In three talukas randomly assigned to the intervention group, traditional birth attendants were trained and issued disposable delivery kits; Lady Health Workers linked traditional birth attendants with established services and documented processes and outcomes; and obstetrical teams provided outreach clinics for antenatal care. Women in the four control talukas received usual care.</p> <p>Primary outcome measures included perinatal and maternal mortality.</p>	<p>10,114 (84.3 percent) were recruited in the three intervention talukas, and 9443 (78.7 percent) in the four control talukas. In the intervention group, 9184 women (90.8 percent) received antenatal care by trained traditional birth attendants, 1634 women (16.2 percent) were seen antenatally at least once by the obstetrical teams, and 8172 safe-delivery kits were used.</p> <p>As compared with the control talukas, the intervention talukas had a cluster-adjusted odds ratio for perinatal death of 0.70 (95 percent confidence interval, 0.59 to 0.82) and for maternal mortality of 0.74 (95 percent confidence interval, 0.45 to 1.23).</p>	<p><i>* This study focuses largely on perinatal deaths as an impact measure for TBA interventions. It demonstrates the success of training TBAs and integration into the wider health system with provision of adequate referral care.</i></p> <p><i>An RCT was conducted to determine the impact of training and supervision for TBAs.</i></p> <p><i>The method has a large sample size in order to provide sufficient sample sizes in both cohorts.</i></p>
<p><i>Harvey, S. et al (2007) Safe motherhood studies; results from Jamaica. Competency of skilled</i></p>	<p>This study is part of a four country research study into assessment of</p>	<p>Results yielded a mean score of only 58% correct for the knowledge test and 46% on</p>	<p><i>This was a one year study conducted in four countries (Benin, Rwanda,</i></p>

Annex IV: Review of intervention studies for maternal health. *Canavan, A. (2008)*

Study/Location and Year	Study design & methodologies	Results/Findings	Comments by reviewer
<p><i>birth attendants. The enabling environment for skilled attendance at delivery.</i></p> <p><i>QAP URC website at www.urc/qap.org</i></p> <p><i>Bulletin of WHO (2007); 85(10) 733-820.</i></p>	<p>competencies of skilled birth providers – using a purposive sample and a simulated setting (ethical considerations ruled out using actual delivery settings).</p> <p>The Jamacia study outlines the three phases as follows: Phase I – competency assessments using instruments, checklists and tools developed by URC QAP team. Phase II – study of enabling factors including checklist of supplies, drugs, equipment linked with each stage of labour, intrapartum and post partum care. Phase III – The third delay study measured patient flow in four hospitals to assess time intervals between referral and treatment interventions.</p>	<p>the skills test. Hospital-based provider scores were higher than the community-based providers in both tests, in all topics except asepsis</p> <p>Community-based providers’ knowledge about sepsis and active management of third stage labor was low. In the skills test, manual removal of placenta and bimanual uterine compression mean scores were low for all types of providers—only about 38% for hospital-based and 14% for community-based providers. There was little correlation between providers’ self-assessment and their competency as measured by the knowledge and skills tests.</p> <p>Labor monitoring, including checking fetal heart rate and the mother’s blood pressure, was inadequate in most observed cases.</p>	<p><i>Jamacia and Ecuador). It was funded by USAID for URC Quality Assurance Project in collaboration with incountry government and non-government agencies.</i></p> <p><i>This study involves innovative approaches using observation checklists, MCQ questionnaires adapted to measure knowledge levels and simulated settings with anatomical models to test clinical skills of SBAs.</i></p>
<p>Bazzano, A.N. et al (2008). Social costs of skilled attendance at birth in rural Ghana.</p>	<p>The study was conducted in one district (Kintampo) in Ghana in 2004 (pop 165,000). Health facilities include 1 DH, 7 HCs and 7 maternity homes. Four sites were chosen (2 villages and 2 towns).</p> <p>Several methods were used; i. Participant observation over during ANC, delivery and post partum care ii. Indepth interviews with mothers and grandmothers</p>	<p>Birth cohort analysis showed that 85% of women had at least 1 ANC visit but only 30% had the four recommended visits. Home birth is highly valued with the ideal situation of a skilled provider for home delivery. 73% gave birth at home and in part due to lack of confidence with health staff. Loss of status, loss of control over delivery process and increased vulnerability led women to choose home deliveries. Skilled delivery can also incur financial costs; so</p>	<p><i>* This study was funded by WHO and DFID as part of a London School series of studies on social issues in RH. The methodologies consist of a wide range of qualitative/participatory tools. The study is one of the more recent comprehensive insights into social barriers and perceptions of couples and communities regarding preference and practices for delivery.</i></p>

Annex IV: Review of intervention studies for maternal health. *Canavan, A. (2008)*

Study/Location and Year	Study design & methodologies	Results/Findings	Comments by reviewer
	<ul style="list-style-type: none"> i. SSQs with mothers (#45) γ. Case histories from women who recently gave birth. γ. Expert interviews with local health providers i. Focus groups with men and women (max 9 participants) including women who had a child who died. 	<p>home delivery is preferred. Neonatal deaths are 34.3 per 1000 live births.</p> <p>Training of providers in communications and counseling is highly recommended as well as cultural sensitivity training. The social costs of SBA provision are of major consequence as well as financial concerns if women have to give birth at health facilities.</p>	