Maternal Mortality Reduction strategy

UNICEF Eastern and Southern Africa Regional Office

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Every life matters

Every maternal death counts

Foreword

Nearly half of the global estimated annual 515,000 maternal deaths occur in sub-Sahara Africa. Nearly a quarter of these occur in the countries of UNICEF East and South Africa Region (ESAR). The high ratios of maternal mortality in African countries call for an intensified effort to reduce maternal deaths caused by obstetric complications which can be treated. The major direct causes of maternal deaths are unsafe abortion, haemorrhage, sepsis, pre-eclampsia and eclampsia, and obstructed and prolonged labour. The important indirect causes include HIV/AIDS, Malaria, TB, and malnutrition.

Past efforts in reducing maternal mortality have stalled. The failure of these efforts has been attributed to lack of a co-coordinated and focused approach as well as applying strategies that are not evidence-based. It is for this reason that the Regional Management Team (RMT) appointed a Maternal Mortality Reduction Task Force to develop a Regional Strategy from 1998 to 2002. We now have got enough evidence on what works and what does not work. MMR reduction needs to be an explicit objective of other priorities in the Region, such as HIV/AIDS and malaria and not in competition with these for resources. This is particularly true if we are to have an impact in the high perinatal and neonatal mortality in the region.

UNICEF advocates the rights-based approach to programming for MMR reduction. We hold the governments and ourselves accountable for the lives and deaths of women in this Region. We have gone a step further in this strategy note to making maternal deaths notifiable. This is a concrete way of realising women's' rights.

This strategy note provides programmatic guidance for UNICEF staff in setting priorities and assisting governments to prevent maternal deaths and disabilities in UNICEF ESAR, based on evidence available to date.

UNICEF's top priority interventions are directed towards: a) supporting governments to provide high quality emergency obstetric care (EmOC); b) supporting governments to recruit, train, deploy, and maintain health providers; c) supporting governments' efforts to promote family planning; and d) assisting governments monitor programs through the UN Process Indicators.

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1. Background

In its 55th Session, the General Assembly adopted the UN Millennium Declaration, which resolves to reduce maternal mortality by 75 per cent by the year 2015.[i] To reduce maternal deaths effectively, programs must be able to reduce the incidence of pregnancy, prevent, where possible, complications during pregnancy and delivery, and treat obstetric complications.

In 1998, UNICEF ESARO had established a Task Force to advise on the programmatic strategy to reduce MMR. This was later incorporated in the Integrated Early Childhood Development components of the five Medium-Term Strategic Plan (MTSP) priorities adopted by UNICEF globally in 2002. The Task Force worked with country offices, consulted widely with partners and professional groups and concluded its work in 2002.

UNICEF promotes the human rights approach to programming (HRAP). In the 1996 Human Development Report, UNDP defined human development by its three most important components: (1) capability to be well-nourished and healthy, (2) capability for healthy reproduction, and (3) capability to be educated and knowledgeable. The UNICEF strategy therefore centres on enhancing capacities of women, communities and institutions to realise women's right to healthy reproduction.

To implement an effective Safe Motherhood program, governments and civil society require administrative, technical, political and program communication capacities. In a HRAP, governments and civil society are duty-bearers who have to accept and fulfill their obligations. An important step in HRAP is the identification of key relations between the women and her child as a claim-holder and all duty-bearers, and duties to be fulfilled by each stakeholder. In this context, the government becomes the principal duty-bearer in the protection and fulfillment of women's rights. This requires monitoring at all levels of society and the use of the information for the design of new actions to respect, protect, facilitate and fulfill human rights.

1.1 Magnitude of Maternal mortality and morbidity in ESAR

Most of the ESAR countries that carried out Demographic Health Surveys in recent years have witnessed quite significant increases in MMR. For example, in Malawi, the maternal mortality ratio had dramatically increased form 620 per 100,000 live births in 1992 to 1120 in 2000. This increase reflects the gradual deterioration of social and economic situation in the country compounded by the high levels of chronic malnutrition, high levels of illiteracy, especially among women, and high levels of HIV/AIDS[ii]. To reduce MMR is a UNICEF ESARO priority, within the Integrated Early Childhood Development MTSP. The table below summarises the maternal mortality and morbidity burden in ESAR by country.

Table 1. Maternal Mortality and Morbidity Burden

Country	MMR	Annual no. of births 2001	Estimated no. of women experiencing life-threatening conditions	Estimated no. of women suffering from acute obstetric morbidity	Estimated no. of maternal deaths
Somalia	1600	481,000	72,150	192,400	7,696
Angola	1500	697,000	104,550	278,800	10,455
Ethiopia	1400	2,848,000	427,200	1,139,200	39,872
Burundi	1300	284,000	42,600	113,600	3,692
Rwanda	1300	320,000	48,000	128,000	4,160
Malawi	1120	522,000	78,300	208,800	5,846
Mozambique	1100	795,000	119,250	318,000	8,745
Eritrea	1000	152,000	22,800	60,800	1,520
Zambia	650	448,000	67,200	179,200	2,912
Lesotho	610	68,000	10,200	27,200	415
Sudan (South)	550	1,098,000	164,700	439,200	6,039
Tanzania	530	1,393,000	208,950	557,200	7,383
Uganda	510	1,222,000	183,300	488,800	6,232
Comoros	500	28,000	4,200	11,200	140
Madagascar	490	696,000	104,400	278,400	3,410
Zimbabwe	400	459,000	68,850	183,600	1,836
Kenya	590	1,080,000	162,000	432,000	6,372
Botswana	330	49,000	7,350	19,600	162
Namibia	270	63,000	9,450	25,200	170
S. Africa	230	1,105,000	165,750	442,000	2,542
Swaziland	230	32,000	4,800	12,800	74
Mauritius	21	19,000	2,850	7,600	4
Total ESARO		**13,868,000**	**2,080,200**	**5,547,200**	**119,677**

Notes:
1. About 15% of pregnant women experience life-threatening obstetric conditions during pregnancy
2. About 40% of pregnant women experience acute obstetric morbidity during pregnancy

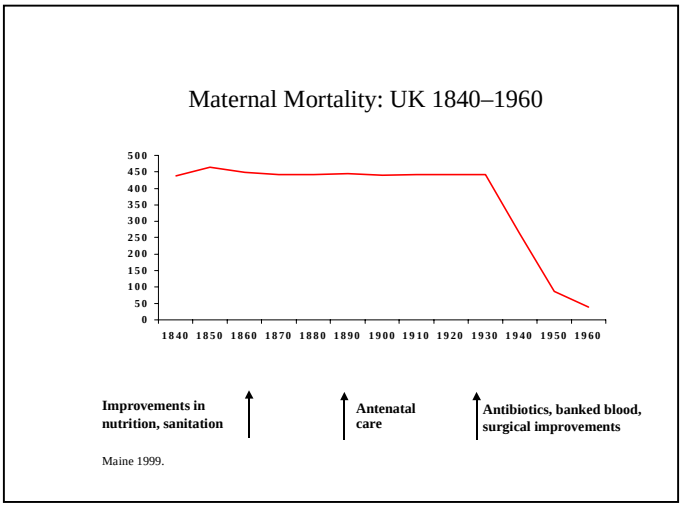
2. The Evidence and Paradigm Shift

From: If we take very good care of pregnant women, they will be okay. To: All pregnant women need access to EmOC.

There is growing consensus based on evidence that 24-hour quality **EmOC services** constitute the most effective response to prevent maternal deaths and disabilities.

2.1 Historical Evidence:

Historical studies show that MMR decreased in industrialised nations in the beginning of the 20th century. These reductions have not been attributed to economic growth but to the diffusion and professionalisation of obstetric care. In the brief period of fifteen years, maternal mortality fell so steeply in England and Wales in 1950 that the MMR was only a fifth of the ratio in 1935; Scotland shows a similar trend.



The sudden and profound decline in maternal mortality was not due to a single factor, but a combination of changes that came into effect during this period. The most important factors that led to the reduction in maternal mortality were introduction of penicillin, blood transfusion on a large scale, and improved obstetric care in general.[iii]

2.2 Current Evidence:

A study in Matlab, Bangladesh has provided support for community--based EmOC programmes. Three years of the maternity care program, which included services to manage life-threatening complications, demonstrated a significant reduction in direct obstetric mortality compared with the three previous years of no intervention. Direct obstetric mortality was cut in half between 1976-86 and 1987-89 in the northern area where the maternity care programme was initiated. The government recruited and trained nurses and midwives who were able to identify complications related to pregnancy and treat complications when possible, while referring others to the central clinic at Matlab.[iv]

Maternal Mortality in Egypt has declined from 174/100,000 to 84/100,000 between 1992-3 and 2000. This dramatic reduction in maternal deaths is a major achievement and proof of Egypt's sustained efforts to improve quality obstetric care while reducing the fertility rate and unwanted births. As of 2001, a total of 75 rural hospitals and primary health care units have been upgraded to offer normal delivery care and to improve linkages with referral centers in the five governorates of Upper Egypt, which reaches over 8 million Egyptians.

Obstetric services in 25 governorates and district hospitals have been upgraded to ensure access to quality EmOC services. In each of the target facilities, medical and nursing personnel (1300) completed competency-based training on the EmOC protocols and clinical supervision was improved.[v]

The combination of basic and comprehensive EmOC with referral support is the most effective and cost-effectives measure to reduce maternal deaths. [vi]

Programmes	% Death averted	Cost of prog. ($ 000s)	Cost per death averted
Trained TBAs	3	138	17,250
Upgraded TBAs	7	184	11,500
Antenatal care	11	460	17,692
Basic EmOC	25	250	4,098
Basic and Comprehensive EmOC	67	605	3,795

2.3 Evidence suggests that most components of **antenatal care** based on the *risk-approach* do not prevent maternal deaths. The *risk approach* relies on the assumption that obstetric complications can be predicted and prevented. Studies, however, have shown that the majority of women identified as being "at risk" will not acquire complications while the majority of women who develop complications are low-risk.[vii] Therefore, most obstetric complications cannot be predicted and prevented, but can be treated successfully with adequate emergency obstetric care services. Routine and ritual measurements and examinations, which are no longer recommended, include height measurements, ankle edema, and fetal position below 36 weeks.

2.4 Based on evidence to date, UNICEF should not support **TBA training** in isolation, unless it is part of a broader strategy that links with supportive supervision, community participation and referral to EmOC services. However in the vast majority of the situations, TBA programmes are not effectively linked to a functioning referral system. It is often proposed precisely because the people in the area have very limited access to modern medical care. Although TBAs provide cultural and social support and linkage with referral centres, their skills are limited and cannot prevent maternal death in isolation. Trained TBAs are likely to practice hygienic delivery, but there is no significant difference in the level of post-partum infection between trained and untrained TBAs based on a study carried out in Bangladesh[viii]. Therefore, TBA training in isolation will divert the scant resources and attention of governments and donors from interventions which are evidence-based. Thus, in situations where a) the proportion of deliveries by skilled attendants is very low; b) the focus of the program is for referral to EmOC facilities; and c) a functioning health system is in existence, then support for TBAs is warranted[ix].

3. Status of MMR programming in ESAR

A desk review of UNICEF supported safe motherhood programme activities in the region was carried out in February 2003. This included interventions that contributed directly and indirectly to the reduction of maternal deaths between 2000 and 2002. The key findings are:

- There has been significant improvement in understanding the importance of access to quality Emergency Obstetric Care for the reduction of maternal death among UNICEF staff and counterparts. The paradigm shift has begun but not completed.
- All countries with recent survey data showed an increase of Maternal Mortality Ratios due to the HIV/AIDS pandemic, poor economic development, reduced institutional delivery in countries affected by political unrest, armed conflicts, natural disasters and loss of health staff.
- For almost all the countries, the top priority health programme interventions are HIV/AIDS, followed by ECD, Global Accelerated Vaccine Initiatives, and Malaria.
- Twelve countries, Somalia, Angola, Ethiopia, Rwanda, Malawi, Mozambique, Eritrea, Zambia, Tanzania, Uganda, Madagascar and Kenya have programme activities for improving emergency obstetric care services. However, the programme implementations have often been interrupted by various emergencies, such as natural disasters, political instability, war and epidemic of infectious diseases. Most of the EmOC--related interventions were still either limited to selected geographic areas or to a few selected interventions. To scale up the programme activities, extra human and financial resources need to be mobilised.
- Ten countries, Burundi, Zimbabwe, South Africa, Namibia, Botswana, Swaziland, Lesotho, Comoros, Mauritius and Southern Sudan (OLS) did not report any major safe motherhood programme interventions in the last three years. The budget for the health programme had been mostly allocated to support HIV/AIDS and other priority activities.
- TBA training: Almost all countries with current safe motherhood programmes also provided support to TBA training, refresher training, and provision of TBA kits. Supporting TBA training and providing TBA kits tend to be the main safe motherhood programme activities for countries with armed conflicts such as Somalia, Burundi, Eritrea, and Angola. The focus of TBA training was on safe and clean delivery. However a few countries had started involving TBAs in referral of emergency cases.
- All the country programmes used the opportunities of antenatal care to provide other health services including Voluntary Counseling and Testing (VCT) and Prevention Mother To Child Transmission (PMTCT) of HIV/AIDS, tetanus toxoid immunisation, micronutrients supplementation, and distribution of subsidised or free Insecticide Treated Nets (ITNs). The quality and coverage of these services varied.
- Preventive Intermittent Treatment (PIT): several studies have been conducted in Malawi to determine the proportion of women receiving PIT. A randomised household survey in Blantyre, Malawi showed that 76% of pregnant women had taken their first dose of PIT but only 37% women took the second dose. This low administration of two doses of PIT occurred despite 88% of women reporting two or more ANC visits during their pregnancy, and 87% reporting their first visit attendance during the first or second trimester of pregnancy. Countries in East and Southern Africa Region have, in general, low coverage of PIT: Kenya (4.6%), Zambia (20.9%). Other countries do not have data available.

4. MATERNAL MORTALITY REDUCTION STRATEGY

4.1 Purpose of strategy:

The purpose of the programme is to reduce the maternal morbidity and mortality in ESAR contributing to the Millennium Development goal of reducing MMR by 75% of the 1990 level by 2015.

4.2 Strategies

To reduce maternal deaths effectively, the programmes must be able to reduce the incidence of pregnancy, prevent, when possible, complications in pregnancy and childbirth, and treat obstetric complications.

4.3 Programme Issues

4.3.1 Programme priorities: In reducing maternal deaths, not all programme interventions are equally important and effective. In the next few years, the top priority is to support the government to ensure that women have access to emergency obstetric care (EmOC) at any hour of the day or night through: developing human resources for the efficient functioning of facilities (upgrading managerial and technical skills)**;** upgrading facilities and ensuring the necessary logistic support (supplies, equipment, transport, and infrastructure); assuring the delivery of quality EmOC services**;** establishing management information systems in facilities; and strengthening supervision, evaluation, and monitoring of EmOC services. EmOC is the foundation for other services and should be in place first before community mobilisation.

4.3.2 Rights--based approach: Human rights are the foundations of the United Nations. Maternal mortality is associated with women's status and economic dependency. Decisive interventions, such as skilled attendance at birth remain the most inequitably distributed public health intervention. The rights-based programming process demands that the duty-bearers fulfill the rights of the claim--holders. It also requires balancing a good process and good outcome; it entails that communities are empowered to take actions that serve their best interests. Human rights are also at the center of female genital cutting, which is prevalent in some of the ESAR countries.

UNICEF has been working with WHO, development partners, and professional Associations to advocate for mandatory maternal death notification by countries. Maternal Death Notification is a concrete way to advocate and realise women's rights. For reasons similar to birth registration, UNICEF should advocate and support Maternal Death Notification. Making maternal death reportable is a system to address the issue of high maternal mortality. It helps to bring the issue in the Government agenda; prioritises maternal mortality and ensure regular government allocations; improve management of complications through identification of avoidable factors in the health facilities, communities, and homes; and improve the quality and accountability of health systems.

4.3.3 The three delays model: Responding to the three delays will ensure that women survive obstetric complications. While getting EmOC facilities ready, as this first step is crucial, tackling the first and second delays through community participation is vital for the sustained utilisation of EmOC services and reduction of maternal deaths.

4.3.4 Health system: Reducing maternal mortality requires strengthening of the health care system. One strategic entry point is provision and improvement of EmOC. A crucial part of EmOC is the availability of skilled attendants at birth and this requires long term planning. The overall effectiveness of skilled attendants depends, however, on the immediate access to life saving EmOC. Thus, reducing maternal mortality needs a strong and functioning health system. UNICEF should assist governments in setting priorities that strengthen health systems, i.e., provision of 24-hour quality EmOC should be a top priority.

4.3.5 Community participation and capacity development: Community activities should be linked to the "3-Delays model" to reduce the risk of avoidable maternal deaths. The community education activities should address women's rights and should focus on the family to raise awareness and sense of participation. Further, these should raise awareness about pregnancy and childbirth complications and the need for immediate action. Community stakeholders are also vital to hold the government health system accountable on one hand and assist health facilities to delivery quality EmOC services on the other. Community support through mobilisation and strengthening of local capacity, mobilisation of community leaders to support establishment of local transport system, identification of and training community volunteers or TBAs, assisting community health workers and volunteers to provide basic services to people, identifying and arranging for community transportation for EmOC facilities and establishment of community monitoring system is essential for a sustained reduction of MMR.

4.3.6 Direct and indirect causes of maternal deaths: The epidemic of AIDS is reversing the trend of MMR reduction in many African countries. In endemic countries, malaria contributes up to 30% of maternal mortality. Without losing the focus of EmOC, any strategy for maternal and neonatal mortality reduction in Africa today needs to take into account the rapidly evolving AIDS pandemic and malaria in pregnancy.

4.3.7 Inter-sectoral and inter-agency collaboration: Maternal deaths go beyond the health system. Bad roads, poor communication, poverty, wars and conflicts all mean maternal mortality. All relevant government departments should be involved and work together to reduce maternal deaths. Collaboration with WHO, UNFPA, World Bank, other UN agencies, donors, professional organisations, NGOs and CBOs, and private sectors is encouraged to bring synergy and co-ordination to the safe motherhood programmes. Convergence of safe motherhood programme activities with other UNICEF supported initiatives is encouraged. The coordination with the Water and Sanitation programme should ensure that health facilities have running water and basic sanitation facilities; the community component of IMCI should support the efforts of communities to reduce the 1st and 2nd delays; the PMTCT programme

offers a good entry point for promoting antenatal and postnatal care; the Youth programme is closely linked with reducing unwanted pregnancy, and girl's education is crucial in delaying age of marriage and first child bearing.

4.3.8 Family Planning: Every pregnant woman faces risk of developing obstetric complications during pregnancy, during and after childbirth. UNICEF believes women should have access to the information they need to make the decisions, which are best for their family. Basic education and literacy are among the most important determinants of family planning. Because an educated girl is likely to get married later, she reduces her risk of developing infection and dying during childbirth. Her babies are also more likely to survive the first year of life. An educated mother tends to be healthier and raise her family accordingly.

When UNICEF supports increased access to family planning information, it is strictly within the context of maternal and child health programs which focus on education and communication to avert maternal mortality and promote the health and well-being of the child. UNICEF has intensified its training for community health workers, birth attendants and midwives to increase knowledge about safe birthing and delivery practices.

UNICEF does not support any specific method of family planning. UNICEF is convinced that family planning methods are more appropriately decided by individuals in conformity with their social, religious and cultural values.[x]

4.4 Key Interventions

Strategy	UNICEF's contribution and support to
Advocacy and policy change	1. Secure and sustain high-level political commitment to reduce maternal deaths. 2. Regular and increased allocation from the Government to improve coverage and quality of reproductive health services with focus on emergency obstetric cares services. 3. Set up and implement the national safe motherhood programme policies. 4. Support governments initiate legislative measures and policies, which will reduce maternal deaths (e.g., make maternal death notifiable, allowing midwives and nurses to give anesthesia; and delaying the age of marriage). 5. UNICEF should be involved in Sector Wide Approaches, Common Country Assessment/UN Development Assistance Framework and assist governments in the preparation of Poverty Reduction Strategy Papers in order to ensure that prevention of maternal deaths and disabilities is identified as a priority of governments.
Reduce the incidence of pregnancy	1. Support increased access to family planning information 2. Girl's education 3. Support youth friendly adolescent reproductive health activities.
Reduce the incidence of complications among pregnant women	1. Recommend to governments birth-preparedness and complications readiness. 2. The following services are recommended for antenatal care: • ITN and PIT for malaria; • HIV/AIDS prevention and treatment • Health and nutrition education • Iron/folate supplementation during pregnancy and nutrition education • Training of skilled birth attendants in clean and safe delivery • Social communication against FGC, early marriage, and other harmful practices
Improve outcome of obstetric complications	UNICEF's program actions to respond to Delay Number 3 1. Intensify efforts to support governments to ensure that women have access to emergency obstetric care (EmOC) 24 hours a day. Basic EmOC which should be available at the Health Center level includes antibiotics, anticonvulsants, manual removal of placenta, removal of retained products, and assisted vaginal delivery; and Comprehensive EmOC which should be available in district and regional hospitals includes all the elements of Basic EmOC plus caesarian section and blood transfusion.[xi] 2. Encourage and assist Ministries of Health in providing EmOC through: developing human resources for the efficient functioning of facilities (upgrading managerial and technical skills); upgrading facilities and ensuring the necessary logistic support (supplies, equipment, transport, and infrastructure); assuring the delivery of quality EmOC services; establish and implement national standards and guidelines for managing major obstetric complications, setting up management information systems in facilities; and strengthening supervision, evaluation, and monitoring of EmOC services.

	3. Support governments in increasing the proportion of deliveries attended by skilled attendants. UNICEF should assist Ministries of Health to develop practical systems of recruitment, deployment, and maintenance based on the needs of the population. UNICEF should also support governments develop training programs for medical doctors, professional midwives, and nurses in managing complications of pregnancy and childbirth, through both pre and in-service training. UNICEF, moreover, should assist governments remove policy and legislative barriers to the provision of obstetric services by midwives, nurses, and nurse-midwives. 4. While there is a critical shortage of health human resources, there are ways to respond to this problem. Upgrading skills of existing staff, for instance, is an incentive for health personnel to remain in their jobs. This can include training nurse-midwives in life-saving skills; training general practitioners, medical assistants, and midwives in obstetric surgery; and training nurses in anesthetic skills. Policies need to focus on needs of the population rather than on the boundaries of professional cadres.[xii] 5. Assist government and professional organizations to institutionalize maternal mortality audit into the routines of the health system to improve the quality and accountability of services. 6. While recognizing the role of TBAs in assisting normal deliveries and providing social support, every effort must be made to re-orient the role of TBAs to focus on detection of danger signs and prompt referral to a facility providing emergency obstetric care. Linkages with local health facilities, regular supervision, and community support are key to the successful referral system. UNICEF's program actions to respond to Delays Numbers 1 and 2 7. <u>As efforts to ensure the availability of EmOC services are in progress and are in certainty</u>, UNICEF should respond to the two other delays – delay in seeking medical care and delay in reaching the health facility. Measures designed to prevent such delays have to be instituted in the household and community. Also, it is important to invest in strategic communication designed to change behavior of partners and husbands and of entire communities. 8. Improve awareness of women, men, family members, communities, and TBAs in recognizing the five major danger signs during pregnancy, delivery and postpartum period for early referral. 9. Assist Ministries of Health develop clear educational messages, which emphasize the danger signs of obstetric complications and encourage birth-preparedness. 10. Support governments and NGOs/CBOs mobilize community to develop mechanisms for transporting women to an EmOC facility. 11. Support efforts to organize communities around micro-insurance, co-operatives, and health financing mechanisms. UNICEF should likewise support efforts to organize private health providers, to make their services affordable to women in need.

5.0 Monitoring and Evaluation

5.1 The UN process indicators

UN process indicators are effective management tools, and not poor substitutes of MMR. The UN process indicators measure the coverage and utilization of EmOC services, and quality of care of these services. These indicators can be used for needs assessments and monitoring progress. They are: (1) Amount of EmOC services available; (2) Geographical distribution of EmOC facilities; (3) Proportion of all births in EmOC facilities; (4) Met need for EmOC services; (5) Cesarean section as a percentage of all births; and (6) Case fatality rate.[xiii]

The assessment can be complemented by coverage of skilled attendant, maternal deaths review and community knowledge, attitude and practices regarding the major danger signs and obstetric complications.

5.2 Maternal mortality audit – providing evidence for action

The five methods promoted by WHO and UNICEF are: verbal autopsy, facility-based death reviews, confidential enquiries into maternal deaths, near- misses review, and clinical audit. The five steps are identification of deaths, confidential data collection, anonymous analysis, recommendations for action and guidelines, and evaluation and refinement. Countries should incorporate the activity into the routines of the health systems, build in sustainability from the beginning, start simple and practical, and then expand gradually. [xiv]

Maternal mortality audit is useful for many purposes. For example, verbal autopsy carried out in Mexico found out that most of the mothers did not know danger signs and did not have access to transport. Health facility based audit in Java found out that most of the deaths were due to retained placenta; because midwives did not have the skills forgot how to handle the problem. These reviews had led to actions that improved quality of care.

5.3 Document successes and lessons:

Document successes and lessons should be carried out regularly as a way to identify best practices and avoid repeating mistakes. Successful stories should be celebrated and used as motivations.

5.4 Programme evaluation:

Programme evaluation should be carried out, to identify the outcome and impact of interventions, difficulties and shortfalls, cost and cost-- effectiveness, and future directions. Evaluation of projects before scaling up allows critical analysis of the key programme interventions.

Endnote:

[i] The millennium declarations, Resolution A/RES/55/2. New York, United Nations, 2000.
[ii] UNICEF Malawi 2002 Annual Report.
[iii] Loundon, I. Death in childbirth: an international study of maternal care and maternal mortality 1800-1950. Oxford University Press, 1992.
[iv] Maine, D., et al. "Why Did Maternal Mortality Decline in Matlab?" *Studies in Family Planning,* Vol. 27, 4; July/Aug 1996.)
[iii] Egyptian Ministry of Health and Population, Egypt National Maternal Mortality Study 2000, USAID, JSI.
[vi] iv. Maine, D. Safe Motherhood Programs: Options and Issues, 1991
[vii] Maine, D, et al. "Meeting the Community Half Way: Programming Guidelines for the Reduction of Maternal Mortality." UNICEF, New York, unpublished, 1993.
[viii] Goodburn E. 2002
[ix] European Commission, "A strategy for improving maternal and perinatal health through strengthening health systems and services." 2001.
[x] UNICEF. Q &A on National Catholic Register Article. 7 August 2003.
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[xiii] Maine. D. et al. The design and evaluation of maternal mortality programs. 1997
[xiv] Beyond The Numbers (Draft). Reviewing maternal deaths and complications to make pregnancy safer. WHO. 2003