Reduction of maternal mortality

A Joint WHO/UNFPA/UNICEF
World Bank Statement

WORLD HEALTH ORGANIZATION
GENEVA
1999

WHO Library Cataloguing-in-Publication Data

Reduction of maternal mortality : a joint WHO/UNFPA/UNICEF/World Bank statement.
1. Maternal Mortality 2. Risk factors 3. Interinstitutional relations
ISBN 92 4 156195 5 (NLM classification: HB 1322.5)

Designed by WHO Graphics
Typeset in Switzerland
Printed in Switzerland
99 / 12419 / Strategic /PCL-10000

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Preface

Worldwide, nearly 600 000 women between the ages of 15 and 49 die every year as a result of complications arising from pregnancy and childbirth. The tragedy is that these women die not from disease but during the normal, life-enhancing process of procreation. Most of these deaths could be avoided if preventive measures were taken and adequate care were available. For every woman who dies, many more suffer from serious conditions that can affect them for the rest of their lives. Maternal mortality is an indicator of disparity and inequity between men and women and its extent a sign of women's place in society and their access to social, health, and nutrition services and to economic opportunities.

The poor health and nutrition of women and the lack of care that contributes to their death in pregnancy and childbirth also compromise the health and survival of the infants and children they leave behind. It is estimated that nearly two-thirds of the 8 million infant deaths that occur each year result largely from poor maternal health and hygiene, inadequate care, inefficient management of delivery, and lack of essential care of the newborn.

The International Conference on Population and Development (Cairo, 1994), the Fourth World Conference on Women (Beijing, 1995) and the Safe Motherhood Technical Consultation (Colombo, 1997) have helped to focus the attention of the international community on the need for accelerated action to achieve the World Summit for Children[1] goal of reducing maternal mortality by half. The Safe Motherhood Consultation placed maternal mortality in the context of human rights, urging governments to use their political, legal, and health systems to fulfil the obligations imposed by their endorsement of various international human rights instruments. Experts

[1] New York, 1990.

from WHO, UNFPA, UNICEF, the World Bank, the Population Council, the International Planned Parenthood Federation, and other national and international agencies concerned with safe motherhood reviewed progress over the past 10 years and concluded that it is possible to reduce maternal mortality significantly with limited investment and effective programme and policy interventions.

An important lesson learned over the past decade has been that interventions to reduce maternal deaths cannot be implemented as vertical, stand-alone programmes. Maternal mortality is not merely a "health disadvantage", it is a "social disadvantage". Health, social, and economic interventions are most effective when they are implemented simultaneously. Safe motherhood interventions should be implemented in the context of broader health programmes, including nutritional advice and micronutrient supplementation, child survival and development, immunization, safe water and sanitation, family planning, the avoidance of unwanted pregnancies, and the prevention and control of malaria and of HIV/AIDS and other sexually transmitted diseases.

This joint statement represents a consensus between WHO, UNFPA, UNICEF, and the World Bank and is an example of the common purpose and complementarity of programmes supported by the four agencies and designed to reduce and prevent maternal and neonatal mortality and morbidity. The principles and policies of each agency are governed by the relevant decisions of its governing body and each agency implements the interventions described in this document in accordance with these principles and policies and within the scope of its mandate. The statement draws on lessons learned and knowledge gained by countries worldwide in their efforts to reduce and prevent maternal and neonatal deaths, identifies the issues involved in selecting appropriate interventions, and builds a consensual approach to addressing the problem effectively.

The key messages of this joint statement include the policy and legislative actions essential to the reduction of maternal

mortality as well as the social and community interventions that must accompany any actions by the health sector. Safe motherhood is perceived as a human right, underpinned by laws that support effective action to increase women's access to appropriate services. Families and communities have a major role to play in making that access possible and in protecting women's health through improved nutrition and the prevention of unwanted pregnancy. The health sector is encouraged to make good-quality services, including essential care for obstetric complications, available to all women during pregnancy and childbirth, with particular emphasis on ensuring that a skilled attendant is present at every birth. The final message underlines the importance of monitoring progress through the use of appropriate indicators and analysis of each maternal death to identify contributory factors that could have been mitigated or avoided.

This statement is addressed to governments, policy-makers in social, economic, and health fields, managers of maternal and child health and nutrition programmes, nongovernmental organizations, community members, and WHO, UNFPA, UNICEF and World Bank personnel. It is intended to help them in decision-making at national and local levels, in adapting interventions to the needs of a specific country or situation, and in mobilizing and making the most effective use of resources to ensure safer pregnancy and childbirth.

1. Introduction

Every minute of every day, somewhere in the world, a woman dies as a result of complications arising during pregnancy and childbirth. The majority of these deaths are avoidable.

The right to life is a fundamental human right, implying not only the right to protection against arbitrary execution by the state but also the obligations of governments to foster the conditions essential for life and survival. Human rights are universal and must be applied without discrimination on any grounds whatsoever, including sex. For women, human rights include access to services that will ensure safe pregnancy and childbirth.

Since the 1940s, maternal deaths have become increasingly rare in developed countries. The same cannot be said, however, of developing areas, where the persistence of high levels of maternal mortality is symptomatic of a pervasive neglect of women's most fundamental human rights. Such neglect affects most acutely the poor, the disadvantaged, and the powerless. For more than half a million women, death is the last episode in a long story of pain and suffering; millions more women are damaged and disabled, many of them for the rest of their lives. The suffering often goes beyond the purely physical and affects women's ability to undertake their social and economic responsibilities and to share in the development of their communities.

Maternal death is a tragedy for individual women, for families, and for their communities.

High levels of maternal mortality are not only a "woman's problem". Poor maternal health and its inevitable corollary — poor infant and child health — affect everyone. Women are the mainstays of families, the key educators of children, healthcare providers, carers of young and old alike, farmers, traders, and often the main, if not the sole, breadwinners. A society deprived of the contribution made by women is one that will see its social and economic life decline, its culture impoverished, and its potential for development severely limited.

In 1987, the first International Safe Motherhood Conference took place in Nairobi and the goal of a 50% reduction in the 1990 levels of maternal mortality by the year 2000 was formulated. This goal was later adopted by national governments and by other international conferences, including the World Summit for Children in New York in 1990, the International Conference on Population and Development in Cairo in 1994, and the Fourth World Conference on Women in Beijing in 1995.

Much more is known now than it was 10 years ago about the interventions that are effective, the barriers to access to care, the constraints on implementation of programmes, and the specific elements of care that must be provided. The lessons that have been learned were highlighted at an international Technical Consultation held in Colombo, Sri Lanka, in October 1997 to mark the tenth anniversary of the Safe Motherhood Initiative. In the course of the Consultation, the United Nations agencies most closely involved in the development and implementation of reproductive health programmes reached consensus on the measures that work, what they cost, and how they can be effectively implemented. This joint statement reflects that consensus and presents the way forward for everyone concerned with any aspect of safe motherhood.

2. Safe motherhood is a human rights issue

The death of a woman during pregnancy or childbirth is not only a health issue but also a matter of social injustice.

Of the human rights currently acknowledged in national constitutions and in regional and international human rights treaties, many can be applied to safe motherhood. Many such treaties and conventions are based on the 1948 Declaration of Human Rights (*1*); they include the Convention on the Elimination of All Forms of Discrimination against Women (*2*), the Convention on the Rights of the Child (*3*), the European Convention for the Protection of Human Rights and Fundamental Freedoms (*4*), the American Convention on Human Rights (*5*), and the African Charter on Human and Peoples' Rights (*6*).

Human rights of relevance to safe motherhood can be grouped into the following four principal categories:

- **Rights relating to life, liberty and security of the person**, which require governments to ensure both access to appropriate health care during pregnancy and childbirth, and women's rights to decide whether, when, and how often to bear children. Governments must therefore address factors within the economic, legal, social, and health systems that deny women these fundamental rights.

- **Rights relating to the foundation of families and of family life**, which require governments to provide access to health services and other facilities that women need to establish families and to enjoy life within a family.

- **Rights relating to health care and the benefits of scientific progress, including health information and education**, which require governments to provide access to good sexual and reproductive health care with appropriate referral systems. The measures needed to ensure safe motherhood can be provided through primary health care irrespective of a country's level of economic development. Central to these rights is information on a range of reproductive health issues, including family planning, abortion, and sex education.

- **Rights relating to equality and nondiscrimination**, which require governments to provide access to services such as education and health care without discrimination on grounds such as sex, marital status, age, and socioeconomic class. Discriminatory policies include requirements for a woman to obtain the consent of her husband for particular healthcare interventions, requirements for parental authorization which have a differential impact on girls, and laws that criminalize medical procedures that only women need. Governments are in violation of their obligations when they fail to implement laws that effectively protect women's interests or to allocate health resources to meet women's particular need for safe pregnancy and childbirth.

The actions that governments need to take to promote safe motherhood as a human right fall into three groups:

- **Reform of laws** that prevent women from attaining the highest possible levels of health and nutrition needed for safe pregnancy and childbirth and that inhibit access to reproductive health information and services — such as laws requiring women in need of health care to seek the authorization of husbands or other family members first.

- **Implemention of laws** that foster women's rights to good health and nutrition and that protect women's health interests — such as laws that prohibit child marriage, female genital mutilation, rape, and sexual abuse. Every effort should be made to implement laws that encourage the

healthy timing of births, such as those that support the education of girls, set a minimum age for marriage, and ensure women's access to essential health care.

- **Application of human rights** in national legislation and policy to advance safe motherhood.

3. The dimensions of the problem

What is a maternal death?

A maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, regardless of the site or duration of pregnancy, from any cause related to or aggravated by the pregnancy or its management (see Annex). Maternal deaths are subdivided into direct and indirect obstetric deaths. Direct obstetric deaths result from obstetric complications of pregnancy, labour, or the postpartum period. They are usually due to one of five major causes — haemorrhage (usually occurring postpartum), sepsis, eclampsia, obstructed labour, and complications of unsafe abortion — as well as interventions, omissions, incorrect treatment, or events resulting from any of these. Indirect obstetric deaths result from previously existing diseases or from diseases arising during pregnancy (but without direct obstetric causes), which were aggravated by the physiological effects of pregnancy; examples of such diseases include malaria, anaemia, HIV/AIDS, and cardiovascular disease (*7*).

Measures of maternal mortality

There are three main measures of maternal mortality — the maternal mortality ratio, the maternal mortality rate, and the lifetime risk of maternal death.

- **Maternal mortality ratio** represents the risk associated with each pregnancy, i.e. the obstetric risk. It is calculated as the number of maternal deaths during a given year per 100 000 live births during the same period. Although the measure

has traditionally been referred to as a rate it is actually a ratio and is now usually called such by researchers.[1]

- **Maternal mortality rate** measures both the obstetric risk and the frequency with which women are exposed to this risk. It is calculated as the number of maternal deaths in a given period per 100 000 women of reproductive age (usually 15–49 years).

The terms "ratio" and "rate" are often used interchangeably; for the sake of clarity it is therefore essential, when referring to either of these measures of maternal mortality, to specify the denominator used.

- **Lifetime risk of maternal death** takes into account both the probability of becoming pregnant and the probability of dying as a result of the pregnancy cumulated across a woman's reproductive years.[2]

Where do maternal deaths occur?

The settings where the problem of maternal mortality is most acute are precisely those where it is least likely to be accurately measured.

The first estimates of the extent of maternal mortality around the world were made in the late 1980s. They indicated that globally some 500 000 women die each year from pregnancy-related causes. In 1996, WHO and UNICEF revised the

[1] The appropriate denominator for the maternal mortality ratio would be the total number of pregnancies (live births, fetal deaths (stillbirths), induced and spontaneous abortions, ectopic and molar pregnancies). However, this figure is seldom available, either in developing countries where most births take place or in developed countries, and so the number of live births is generally used as the denominator.

[2] Lifetime risk can be estimated by multiplying the maternal mortality rate by the length of the reproductive period (around 35 years). (See Campbell OMA, Graham WJ, *Measuring maternal mortality and morbidity: levels and trends*, London, London School of Hygiene and Tropical Medicine, 1990.) The lifetime risk can also be approximated by the product of the total fertility rate and the maternal mortality ratio.

estimates for 1990 on the basis of the growing volume of information that has become available in recent years. These new estimates showed that the scale of the problem was significantly greater than had originally been suspected and that closer to 600 000 maternal deaths occur each year, with the overwhelming majority of them in developing countries (see Figure 1). In developed countries, the maternal mortality ratio averages around 27 maternal deaths per 100 000 live births; in developing countries the ratio is nearly 20 times higher, at 480 per 100 000, and may be as high as 1000 per 100 000 in some regions.

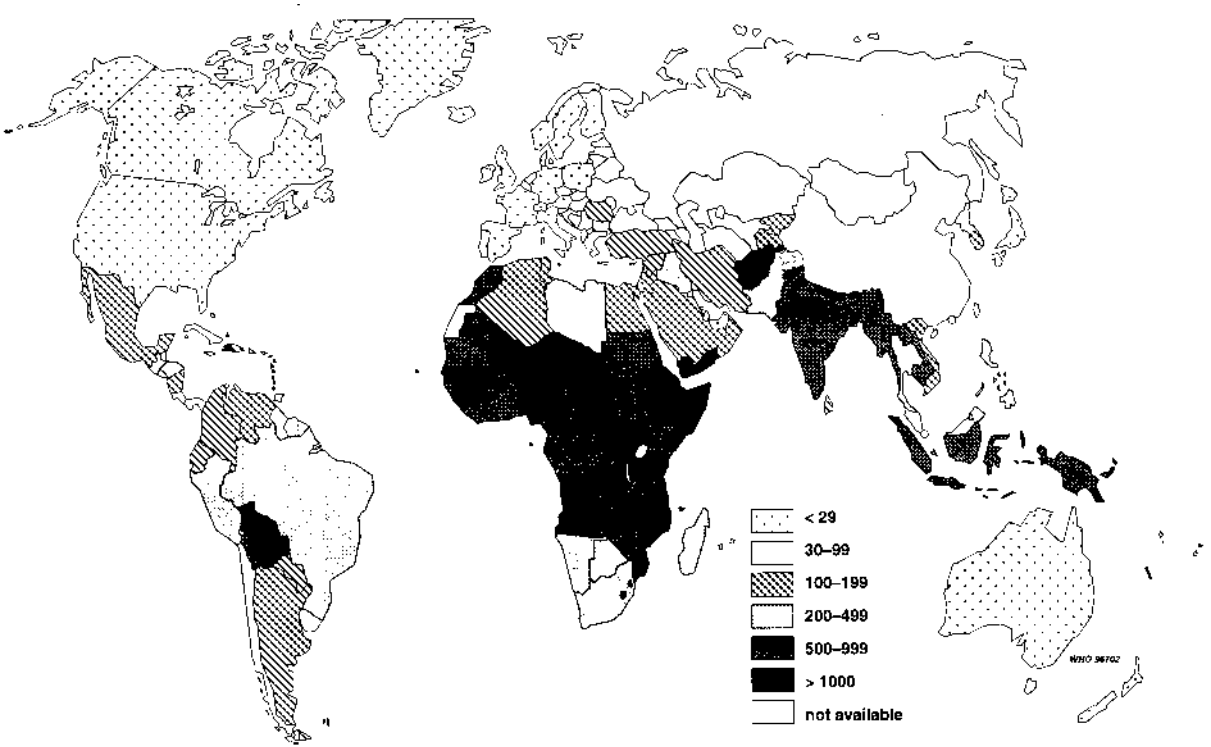
The maternal mortality ratio is a measure of the obstetric risk faced by a woman each time she becomes pregnant. Where women have many pregnancies, the risk of maternal death is magnified. In some developing countries one woman in 12 may die from a pregnancy-related problem compared with one in 4000 in industrialized settings. The discrepancy between these two figures marks one of the starkest and most telling differentials in development. It also reflects huge differences in national commitment, not only between developed and developing countries, but also between different developing countries, where it is far wider than differentials in infant or child mortality (*8*).

Why do women die?

The medical causes of maternal deaths are similar throughout the world.

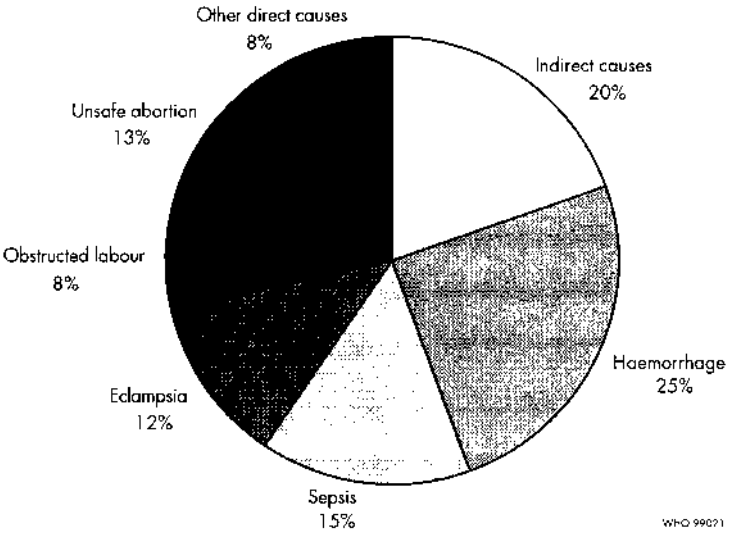
Globally, around 80% of all maternal deaths are the direct result of complications arising during pregnancy, delivery, or the puerperium (see Figure 2). The single most common cause — accounting for a quarter of all maternal deaths — is severe bleeding, generally occurring postpartum.

Figure 1. Maternal mortality ratios (global estimates), 1990 (maternal deaths per 100 000 live births)



The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines represent approximate border lines for which there may not yet be full agreement.

Figure 2. Causes of maternal deaths: global estimates, which vary in different settings



- **Haemorrhage**, especially postpartum haemorrhage, is unpredictable, sudden in onset, and more dangerous when a woman is anaemic. Globally, some 25% of all maternal deaths are due to haemorrhage. Blood loss can very rapidly lead to death in the absence of prompt and appropriate life-saving care which includes the administration of drugs to control bleeding, massage of the uterus to stimulate contractions, and blood transfusion if necessary.
- **Sepsis**, which is often a consequence of poor hygiene during delivery or of untreated sexually transmitted diseases (STDs), accounts for some 15% of maternal deaths. Such infections can be effectively prevented by careful attention to clean delivery and by detection and management of STDs during pregnancy. Systematic postpartum care will ensure rapid detection of infection and its management by appropriate antibiotics.
- **Hypertensive disorders of pregnancy**, particularly **eclampsia** (convulsions), are the cause of approximately 12% of all

maternal deaths. Deaths from hypertensive disorders can be prevented by careful monitoring during pregnancy and by treatment with relatively simple anticonvulsant drugs (e.g. magnesium sulfate) in cases of eclampsia.

- **Prolonged or obstructed labour** accounts for about 8% of maternal deaths. This is often caused by cephalopelvic disproportion (when the infant's head cannot pass through the maternal pelvis) or by abnormal lie (when the infant is incorrectly positioned for passage through the birth canal). Disproportion is more common where malnutrition is endemic, especially among populations with various traditions and taboos regarding the diets of girls and women. It is worse where girls marry young and are expected to prove their fertility, often before they are fully grown.
- Complications of **unsafe abortion** are responsible for a substantial proportion (13%) of maternal deaths. In some parts of the world, one-third or more of all maternal deaths are associated with unsafe abortions. These deaths can be prevented if women have access to family planning information and services, care for abortion-related complications, and, where abortion is not prohibited by law, safe abortion care.

Approximately 20% of maternal deaths are the result of pre-existing conditions that are exacerbated by pregnancy or its management. One of the most significant of these indirect causes of death is anaemia which, as well as causing death through cardiovascular arrest, is thought also to underlie a substantial proportion of direct deaths (particularly those due to haemorrhage and sepsis). Other important indirect causes of death include malaria, hepatitis, heart diseases, and, increasingly in some settings, HIV/AIDS. Many of these conditions are relative or absolute contraindications for pregnancy. Women need to be informed of these problems and enabled to prevent further pregnancies while the conditions are being treated.

4. Factors underlying the medical causes

The low social and economic status of girls and women is a fundamental determinant of maternal mortality in many countries. Low status limits the access of girls and women to education and good nutrition as well as to the economic resources needed to pay for health care or family planning services.

The factors underlying the direct causes of maternal deaths operate at several levels. The low social status of women in developing countries limits their access to economic resources and basic education and thus their ability to make decisions related to their health and nutrition. Some women are denied access to care when it is needed either because of cultural practices of seclusion or because decision-making is the responsibility of other family members. Lack of access to, and use of, essential obstetric services is a crucial factor that contributes to high maternal mortality. Lack of decision-making power and of alternative opportunities consigns many women to a life of repeated childbearing. Excessive physical work coupled with poor diet also contributes to poor maternal outcomes.

Only 53% of pregnant women in developing countries deliver with the help of a skilled attendant.

In developing countries, many women are assisted in delivery by traditional birth attendants or only by relatives; many deliver alone. Only 53% of women in developing countries have the assistance of skilled health personnel (a midwife or doctor),

and only 40% give birth in a hospital or health centre. An estimated 15% of pregnant women will experience life-threatening complications that require emergency care, yet there are almost no data on the proportion with access to such care. In as many as 40% of pregnancies it is likely that there will be a need for some form of special care. Providing skilled attendants able to prevent, detect, and manage the major obstetric complications, together with the equipment, drugs, and other supplies essential for their effective management, is the single most important factor in preventing maternal deaths.

Poor nutrition contributes to poor maternal health and underlies poor pregnancy outcomes.

Poor nutrition before and during pregnancy contributes in a variety of ways to poor maternal health, obstetric problems, and poor pregnancy outcomes:

- **Stunting** during childhood as a result of severe malnutrition exposes women to the risk of obstructed labour due to cephalopelvic disproportion.
- **Anaemia** may be due to several causes, which may interact. These include inadequate intake, and losses due to parasitic infestations and malaria, of iron, folic acid, and vitamin A. Approximately 50% of all pregnant women worldwide are anaemic. Women with severe anaemia are more vulnerable to infection during pregnancy and childbirth, are at increased risk of death due to obstetric haemorrhage, and are poor operative risks in the event that caesarean delivery is needed.
- **Severe vitamin A deficiency** may make women more vulnerable to obstetric complications and to associated maternal mortality. Further research is needed on the impact of vitamin A deficiency on pregnancy outcome and on the feasibility of introducing vitamin A supplementation into maternal health care programmes.

- **Iodine deficiency** increases the risk of stillbirths and spontaneous abortion and, in severely deficient areas, may contribute to maternal death through severe hypothyroidism.
- **Lack of dietary calcium** appears to increase the risk of a woman developing pre-eclampsia and eclampsia during pregnancy. Calcium supplementation seemingly has little impact in preventing pre-eclampsia in areas where dietary intake is sufficient but may be an important option where diets are deficient in calcium.
- **Other micronutrient deficiencies** probably contribute to poor health and adverse pregnancy outcomes in some parts of the world, although evidence on the benefits of supplementation during pregnancy is not yet available.

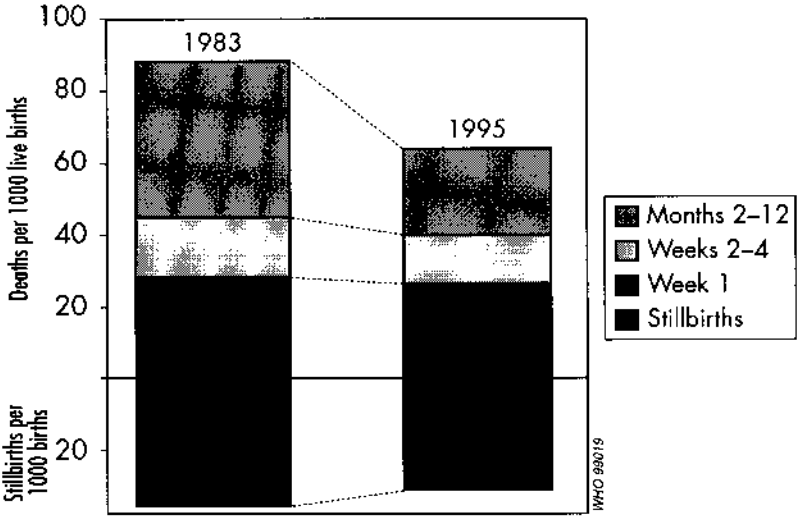
5. Impact of maternal deaths

Maternal death has implications for the whole family and an impact that rebounds across generations. The complications that cause the deaths and disabilities of mothers also damage the infants they are carrying. Of nearly 8 million infant deaths each year, around two-thirds occur during the neonatal period, before the age of 1 month; 3.4 million of these neonatal deaths occur within the first week of life and are largely a consequence of inadequate or inappropriate care during pregnancy, delivery, or the first critical hours after birth. Moreover, for every neonate who dies at least one other infant is stillborn (*9*).

Significant additional reductions in infant mortality can be achieved with interventions designed to improve the health of the mother and her access to care during labour, birth, and the critical hours immediately afterwards.

Recent improvements in infant mortality rates have been largely the result of immunization against the diseases of childhood and better control of diarrhoeal diseases; by contrast, early neonatal mortality rates have changed little (see Figure 3).

Figure 3. Stillbirths and deaths in the first week remain high in developing countries



6. What is known about reducing maternal mortality?

Historical records demonstrate the significant improvements that can be achieved when key interventions are in place. Reductions in maternal mortality took place in Sweden during the 1800s, for example, as a result of a national policy favouring professional midwifery care for all births, coupled with establishment of standards for quality of care. By the beginning of the 20th century, maternal mortality in Sweden was the lowest in Europe — around 230 per 100 000 live births compared with over 500 per 100 000 in the mid-1880s (*10*). In Denmark, Japan, Netherlands, and Norway, similar strategies produced comparable results. In England and Wales, significant reductions in maternal mortality were not apparent until the 1930s; at the national level, political commitment to the strategy was achieved only slowly and the introduction of professional midwifery was correspondingly delayed. In every case, however, the key to these improvements was the institution of fully professional maternity care.

In the USA, where strategy focused on hospital delivery by doctors, maternal mortality remained high because it proved difficult to establish adequate regulatory frameworks and mechanisms to ensure quality of care. In 1930, the maternal mortality ratio in the USA was still 700 per 100 000 live births compared with 430 in England and Wales.

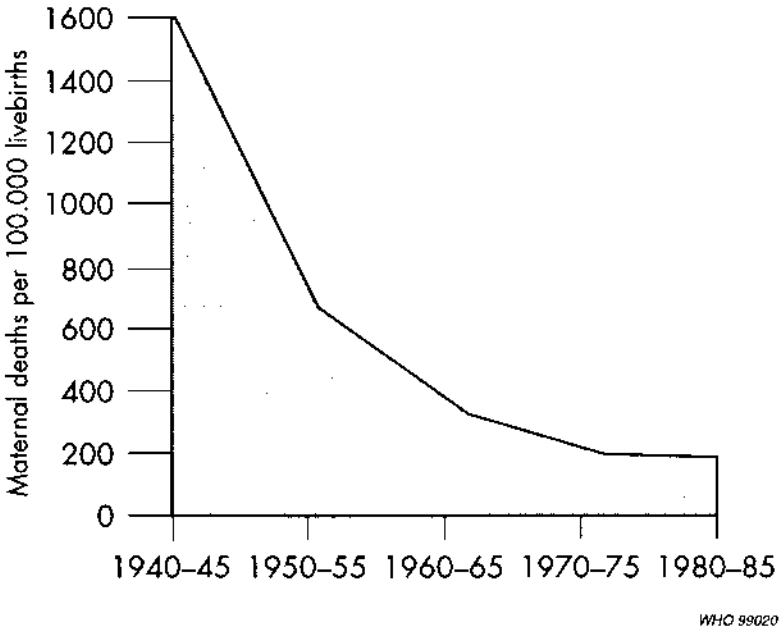
More recently, Sri Lanka witnessed significant reductions in maternal mortality in a relatively short period (see Figure 4). From a level of over 1500 per 100 000 live births in 1940–1945, maternal mortality fell to 555 per 100 000 in 1950–1955, 239 per 100 000 within 10 years, and 95 per 100 000 by 1980. The figure is now 30 per 100 000. These improvements followed the introduction of a system of health facilities around the country allied to an expansion of midwifery skills and the spread of

family planning. During the 1950s most births in Sri Lanka took place at home with the assistance of untrained birth attendants. By the end of the 1980s over 85% of all births were attended by trained personnel.

Similar evidence of the effectiveness of health care interventions is available from China, Cuba, and Malaysia. These countries established community-based maternal health care systems comprising prenatal, delivery, and postpartum care and a system of referral to a higher level of care in the event of obstetric complications.

What these examples clearly demonstrate is that a country's overall economic wealth is not in itself the most important determinant of maternal mortality. There are numerous other examples of countries with modest levels of GNP which have achieved low maternal mortality.

Figure 4. Maternal mortality in Sri Lanka, 1940–1985



7. Action for safe motherhood

Countries vary enormously in terms of the situations and challenges they face and their capacity to address these. However, experience from around the world over the past decade has demonstrated that a number of features are common to successful efforts to address maternal mortality. Reducing maternal mortality requires coordinated, long-term efforts. Actions are needed within families and communities, in society as a whole, in health systems, and at the level of national legislation and policy. Further, interactions among the interventions in these areas are critical to reducing maternal mortality and to building and supporting momentum for change.

Legislative and policy actions

Changes in legislation and policy are essential to ensure safe motherhood.

Long-term political commitment is an essential prerequisite. When decision-makers at the highest levels are resolved to address maternal mortality, the resources needed will be mobilized and the essential policy decisions will be taken. Without this level of commitment over the long term, projects cannot become programmes and activities cannot be sustained.

A supportive social, economic, and legislative environment allows women to overcome the various obstacles that limit their access to health care, such as distance from their homes to appropriate health facilities, lack of transport and, more critically, financial and social barriers. Proper maternal health care is limited when women have to pay for services and essential drugs, and when they must bear substantial hidden costs such as time lost for housework, paid employment, food

production, and child care. Legislation that supports women's access to care must be formulated to permit health workers at the periphery of the health system to perform specific life-saving functions. Failing this, only highly skilled health professionals, based largely in urban centres, can provide such care, and only women with sufficient money and the means to reach such centres can benefit from it.

With these objectives, careful review of national laws and policies is necessary, particularly in the following areas:

- **Family planning.** Statutes that restrict women's access to family planning services (e.g. by requiring that a woman be married or that she should have her husband's approval) should be repealed. Policies must ensure that all couples and individuals have access to good-quality, voluntary, client-oriented, and confidential family planning information and to services that offer a wide choice of effective contraceptive methods. Policies should address regulatory, social, economic, and cultural factors that limit women's control over sexuality and reproduction, in order that pregnancies that are too early, too late, or too frequent may be avoided.

- **Adolescents and children.** Policies and programmes should encourage later marriage and childbearing and an expansion of the economic and educational opportunities for girls and women. Promotion of good nutrition in childhood and adolescence, as well as supplementation if necessary during pregnancy, provides protection for both women and their future children. Policies should also enable adolescents to take responsibility for and protect their sexual and reproductive health, and facilitate their access to health information and services. All children, before they reach the age at which they become sexually active, need to be taught the risks of unprotected sex and helped to develop the skills needed to protect themselves from sexual coercion.

- **Barriers to access.** Assigning health workers trained in midwifery to village-based health facilities can help over-

come problems of distance and transport. Health workers should also be trained to deal sympathetically with women patients. Policies should support the provision of services at minimum cost; at the same time, health workers should have job security, be paid adequate wages, and be provided with sufficient supplies to do their jobs. Policies that will increase women's decision-making power, particularly in regard to their own health, are also essential.

- **Regulation of practice.** Protocols and statutes aimed at providing both routine maternal care and referral facilities for obstetric complications at each level of the health system need to be developed. Responsibilities at each level for supervision, deployment of healthcare personnel, remuneration, and reporting procedures must be defined nationally. Development and promotion of education and training curricula are important, as is the setting of national norms and standards to govern the selection of trainees, trainers, and supervisors.

- **Delegation of authority.** Services should be decentralized so that facilities are available as close to people's homes as possible. Adequate supplies and equipment and trained staff should be available in all health facilities, particularly in rural and remote areas, together with written policies and protocols to guide service provision and to allow certain functions to be delegated to personnel at lower levels (when appropriately trained).

- **Abortion.** Availability of services for management of abortion complications and post-abortion care should be ensured by appropriate legislation. Where abortion is not prohibited by law, facilities for the safe termination of pregnancy should be made available. National policy can discourage unsafe abortion practices by promoting protection against unwanted pregnancy, and national health campaigns to publicize the risks of unsafe abortion and the need to recognize and seek treatment for abortion complications.

Society and community interventions

The support of families and communities is a key to maternal mortality reduction.

The long-term commitment of politicians, planners, and decision-makers to safe motherhood programmes depends on popular support. Input from a wide range of groups and individuals is therefore essential, including community and religious leaders, women's groups, youth groups, other local associations, and healthcare professionals. National, regional, and district safe motherhood committees should be set up as appropriate and where they will be most effective. Health facility and community committees can be established to investigate maternal deaths and to help identify and implement strategies for improvement in such areas as referral, emergency transport, deployment and support of healthcare providers, and cost-sharing. Local committees also have a key role to play in monitoring and evaluating programmes — identifying weaknesses and taking appropriate action.

Women need support in obtaining access to essential care.

Raising awareness of the need for women to reach emergency care without delay if complications arise during delivery is particularly critical. Because many women deliver alone or with a relative, community members must be trained to recognize danger signs and develop plans for emergencies, including transport to hospitals or health centres, and local insurance funds to help cover the costs of care. Communications — radios, telephones and transportation for emergency cases — can be organized with financial support from communities. Cheap and simple delivery kits can be distributed to pregnant women for home births and deliveries in primary healthcare facilities; these

kits will help to ensure that deliveries take place in clean conditions and to prevent at least some infection-related deaths.

> Training of TBAs alone, in the absence of back-up from a functioning referral system and support from professionally trained health workers, is not effective in reducing maternal mortality.

In many places, the services of skilled professional healthcare providers are not available and traditional birth attendants (TBAs) may be women's only source of care. For many years, governments and international agencies have been investing in TBA training. However, there is no evidence that such training alone leads to reductions in maternal mortality, although TBAs can provide culturally appropriate nurturing in the community setting, offer a first-line link with the formal healthcare system, and provide some simple services such as the distribution of nutrition supplements. A useful strategy in a range of settings has been to train TBAs to recognize problems during delivery and, when necessary, to guide women to and through the formal healthcare system. Where TBA training is undertaken, it should be part of a broader strategy that includes a built-in mechanism for referral, supervision, and evaluation.

> A diet that provides sufficient calories and micronutrients is essential for a pregnancy to be successfully carried to term. Supplementation and/or fortification can help where micronutrient deficiencies are endemic.

The term malnutrition includes both protein–energy malnutrition and the lack of specific nutrients. Where malnutrition is endemic or severe food shortages arise as a result of seasonal fluctuations or agricultural crises, food supplementation can help to ensure both that adolescent girls continue to grow during pregnancy and that all women have a sufficient intake of

calories for successful pregnancy and lactation. Deficiencies in iron/folate, calcium, iodine, and vitamin A can give rise to poor maternal health and to pregnancy complications. Focused supplementation of particular micronutrients can therefore be an important component of health services for pregnant women, particularly in cases where communities suffer from extreme poverty and malnutrition.

In the long term, improvement in women's nutrition is essential to solving the problem of malnutrition and its impact on pregnancy and childbirth. Such a change can take place only at the community level and in the household, where women often eat less, less often, and less nutritiously than their children and other family members. Community education efforts are essential to reverse widespread beliefs and practices that militate against adequate nutrition for pregnant women and to raise awareness that preparation for successful pregnancy and childbirth begins well before adulthood, with adequate nutrition for girls.

Women's overall health influences maternal health. Key issues are HIV/AIDS and other major diseases, depending on local epidemiological patterns.

Infection with HIV is a rapidly growing threat to women's health, and AIDS is an increasingly common cause of maternal death in many countries. The HIV/AIDS pandemic highlights the need for women to be able to resist sexual coercion, to be informed about the health risks of unprotected sex, and to have access to services and counselling if they fear they are at risk. About 15–35% of all infants born to HIV-infected women are themselves infected with the virus before or during birth or through breastfeeding.

Tuberculosis is also a growing problem in many countries and is closely linked to HIV/AIDS. Malaria contributes in several different ways to poor maternal and neonatal health. In some countries hypertension, heart disease, and kidney disease are

relatively common and all contribute to maternal deaths. Where female genital mutilation is practised the resultant scarring often leads to problems during labour and delivery. Addressing such issues, many of which are known contraindications for pregnancy, is an essential element of all efforts to reduce maternal mortality.

Prevention of unwanted pregnancy and prevention and management of unsafe abortion are key interventions for safe motherhood.

Enabling women and families to choose whether, when, and how often to have children is central to safe motherhood. The availability of family planning information and services to women, including adolescents, helps to limit pregnancies in which complications may occur. Pregnancies among very young women and women with many children, and unwanted pregnancies are all associated with increased likelihood of mortality. Women whose pregnancies are unwanted may seek terminations, even when safe termination is prohibited by law or unavailable. Complications of unsafe abortion are responsible for 13% of all maternal deaths, yet these deaths are among the most easily preventable. Whatever a country's legal position on abortion, all women suffering from abortion-related complications have a right to treatment and high quality post-abortion care, including family planning counselling and services, offered with compassion and full confidentiality.

Safe motherhood programmes should include promotion of family and community support for delayed marriage and childbearing, timely and planned pregnancies, and improved health, nutrition, and education for all girls and women.

Health sector actions

The role of the health sector in reducing maternal mortality is to ensure the availability of good-quality essential services to all

women during pregnancy and childbirth. With a minimum of good care most women will complete their pregnancies uneventfully; without it, women frequently suffer avoidable complications, which are sometimes life-threatening and often have long-lasting consequences. There is a growing understanding that, while certain pregnancy complications can be prevented, a large proportion that occur particularly around the time of birth can be neither prevented nor predicted. Clearly, the presence of skilled birth attendants is crucial for the early detection and appropriate, timely management of such complications.

Maternal deaths can be prevented through one of three mechanisms: prevention of pregnancy, prevention of complications during pregnancy, and appropriate management of any complications that do occur. Essential services related to pregnancy and childbirth focus mainly on these three areas, and the health-care sector should therefore ensure that the following services are in place and functioning effectively:

- **Client-centred family planning information and services**, which offer women, men, and adolescents choices that meet their needs.
- **Contraceptive counselling for women who have had an abortion**, appropriate care for women who experience abortion complications, and, where abortion is not prohibited by law, safe services for termination of pregnancy.
- **Basic antenatal and postpartum care**, focusing more on detection and treatment of complications than on schedules of risk assessment which fail to identify many women who have complications. The preconceptual and pregnancy periods offer opportunities to detect and manage nutritional deficiencies and to treat endemic diseases such as malaria, helminth infestations, and sexually transmitted diseases, as well as to offer prophylactic care such as tetanus toxoid immunizations, iron/folate supplementation, and voluntary and confidential counselling for HIV. It is important to plan the place of birth and maximize the chances that a skilled

attendant will be present. Every opportunity must be taken to educate women and their families about when and where to seek care. More emphasis is needed on care in the days after birth, a sensitive but neglected period: postpartum care should include the prevention or early detection of maternal or newborn complications, as well as contraceptive advice to permit adequate maternal recuperation before the next pregnancy.

- A **skilled attendant**, that is a person with midwifery skills, present at every birth. This requires long-term planning of human resources development. Midwifery skills include the capacity to initiate the management of complications and obstetric emergencies, including life-saving measures where needed.
- **Good-quality obstetric services at referral centres for complications**. As 15% of all births are complicated by a potentially fatal condition, emergency services, including facilities for blood transfusion and caesarean section, must be available.

Who is a skilled attendant?

The term "skilled attendant" refers exclusively to people with midwifery skills (for example, doctors, midwives, nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose 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, recognize the onset of complications, perform essential interventions, start treatment, and supervise the referral of mother and baby for interventions that are beyond their competence or not possible in the particular setting (*11*). Depending on the setting, other healthcare providers, such as auxiliary nurse/midwives, community midwives, village midwives, and health visitors, may also have acquired appropriate skills *if they have been specially trained*. These individuals frequently form the backbone of maternity services at the periphery, and pregnancy and labour outcomes can be improved by making use of their services, especially if they are supervised by well trained midwives.

In developed countries and in many urban areas in developing countries, skilled care at delivery is usually provided in a health facility. However, birth can take place in a range of appropriate places, from home to tertiary referral centre, depending on availability and need, and WHO does not recommend any particular setting. Home delivery may be appropriate for a normal delivery, provided that the person attending the delivery is suitably trained and equipped[1] and that referral to a higher level of care is an option.

[1] In many countries, TBAs have received training in order to promote safer birth practices, including clean delivery and avoidance of harmful practices. However, to fulfil all the requirements for management of normal pregnancies and births and for identification and management or referral of complications, the education, training, and skills of TBAs are insufficient. Their background may also mean that their practices are conditioned by strong cultural and traditional norms, which may also impede the effectiveness of their training.

8. What can health planners and managers do to ensure that services are in place?

Health planners and managers have key roles in implementing services:

- **Inform, educate, and mobilize** the community regarding danger signs and **work with communities** to improve access to care — for example, through transport schemes, better communications, maternity waiting homes, or local insurance schemes — and in local safe-motherhood committees.
- **Strengthen the referral system** through supportive supervision, regular communication, and logistic/managerial support, including ensuring the availability of essential drugs and supplies.
- **Improve human resources** by offering community-based, hands-on midwifery training programmes and, for personnel already trained, in-service training/updating for skills maintenance.
- **Strengthen midwifery skills** of relevant staff — midwives, nurses, and doctors — and **intensify counselling skills training** for all health workers.
- **Develop and use case management protocols** for obstetric emergencies at each level and **monitor standards** for practice in maternity services.
- **Use health information to improve quality of care**; improve reporting and record-keeping; **analyse** maternal and perinatal deaths and "near misses" on a case-by-case basis (audit) to increase understanding of the pathways to survival and death; make local improvements, identifying substandard care and avoidable factors.

- **Advocate revision and amendment of legislation** to enable an appropriate health service response to obstetric need, including delegation of responsibilities for essential life-saving interventions.

9. How can we find out how well we are doing?

As experience with implementing safe motherhood programmes has grown, it has become increasingly clear that the traditional indicator of maternal health status — the maternal mortality ratio — is not an appropriate indicator for monitoring progress in the short term. There are several reasons for this:

- Few developing countries have sufficiently sophisticated and comprehensive systems of vital registration to allow accurate monitoring of maternal mortality levels. In such circumstances, household surveys have to be used to estimate maternal mortality.
- Maternal deaths are relatively rare events even where maternal mortality levels are high, and all household survey techniques are therefore subject to wide margins of error. Moreover, household surveys are very expensive to implement.
- The simple measurement tools developed in recent years, such as the sisterhood method, are not appropriate for regular monitoring purposes because they provide data relating to a point some time in the past (*12*).

For these and other technical reasons, most safe motherhood programmes now rely on process indicators for regular programme monitoring. Process indicators can include the number and distribution of essential obstetric care services, the proportion of deliveries attended by skilled healthcare providers or occurring in institutional settings, the rates of operative (i.e. surgical) delivery, and institutional case fatality rates. WHO, UNFPA, and UNICEF have developed guidelines for countries to assist them in gathering, analysing, and interpreting such indicators (*13*). The process indicators describe the major pathway to reducing maternal mortality in terms of access to

essential obstetric care services, appropriate utilization of such services, and some aspects of quality of care. An important advantage of these measures is that they are not only relevant for monitoring progress but they also permit policy-makers and planners more effectively to target interventions to reduce maternal mortality and morbidity. Since the information is often derived from routine data or as part of programme implementation, the cost of its collection is limited.

While process indicators such as these are useful for monitoring programmes, more detailed investigations are needed to diagnose the underlying causes of maternal mortality and to identify ways of dealing with them. Health planners can also gather invaluable information by conducting small-scale analyses of maternal deaths. Ideally, investigators should analyse all maternal deaths, whether they take place in a health facility, at home, or between the two. In practice, it may be possible to identify only the deaths occurring in health facilities. Nonetheless, there is much to be learned from an in-depth analysis of these deaths (*14*), starting with deaths identified in hospitals or health centres and tracing the path of each woman back through the healthcare system and into the community. The aim is to help healthcare providers and community members understand the factors that underlie every maternal death and identify those that could have been avoided. Process indicators for aspects of maternal mortality reduction other than access to obstetric services are being developed.

10. Conclusions

Both historical and contemporary evidence shows that reducing maternal mortality requires a national strategy to bring about three essential changes:

- **A societal commitment to ensuring safe pregnancy and birth**. Decision-makers at all levels — political, economic, social, religious, and household — must foster the perception that pregnancy and childbirth can and should be made safer. A long-term commitment is needed to fuel sustainable change and ensure that the necessary inputs are maintained over the several years needed to reduce maternal mortality significantly. Involving communities and decision-makers in the regular analysis of maternal deaths and "near misses" and promoting mechanisms for local accountability help to ensure that commitment is maintained over the long term and that resources are allocated as needed.

- **Improvements in access to, and quality of, health care**. The aim must be to ensure that all pregnant women have access to a skilled attendant at the time of delivery and to the necessary care for obstetric complications when they arise. Additional objectives are to improve access to good contraceptive care, and to address the challenge of unsafe abortion. Ensuring that the necessary skilled personnel are in place will inevitably take time; it will involve building a cadre of trained and skilled healthcare professionals, the gradual expansion of their roles, competencies, and responsibilities, and provision of the infrastructure and the logistic and managerial support they need to function effectively. Good-quality care implies care that is client-oriented and sensitive to the needs of communities and individuals, that maintains high technical quality through adoption of sound norms and standards, and that avoids the use of inappropriate technologies and "overmedicalization".

- **A commitment to the special needs of girls and women throughout their lives**. Particular attention should be paid to the nutritional and educational needs of girls and women, broadening the scope for women to make decisions about the number and timing of children and use of healthcare services, and fostering at all levels a sense of shared responsibility and solidarity with women, particularly at such vulnerable times as during pregnancy and childbirth.

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Annex

Definitions

The Tenth Revision of the International Classification of Diseases (ICD-10) defines a maternal death as: *the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes* (*7*).

Maternal deaths should be divided into two groups:

- **Direct obstetric deaths** — those resulting from obstetric complications of the pregnant state (pregnancy, labour, and the puerperium), from interventions, omissions, or incorrect treatment, or from a chain of events resulting from any of the above.
- **Indirect obstetric deaths** — those resulting from previous existing disease or disease that developed during pregnancy and that was not due to direct obstetric causes but was aggravated by the physiological effects of pregnancy.

ICD-10 also includes a category for "late maternal death", which is defined as: *the death of a woman from direct or indirect obstetric causes more than 42 days but less than one year after termination of pregnancy*.

To facilitate the identification of maternal deaths in circumstances in which cause of death attribution is inadequate, ICD-10 introduced a new category, that of "pregnancy-related death", which is defined as: *the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the cause of death*.