INTRODUCTION

Each year, 600,000 women between the ages of 15 and 45 die in the world from complications arising from pregnancy and childbirth. And for every woman who dies, many more suffer morbidity that can affect them for the rest of their lives. The tragedy is that these women die not from disease, but during the normal life-enhancing process of procreation. What is worse is the fact that most of these deaths could be avoided if preventive measures were taken and adequate care were available.

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. Since the 1940s, maternal deaths in the developed world have become increasingly rare. Not so in developing areas, where persistently high maternal mortality levels are symptomatic of a pervasive neglect of women’s most fundamental human rights, a neglect that is most acutely suffered by the poor, the disadvantaged, and the powerless. The level of maternal mortality reflects women’s place in society, as well as their access to social health and nutrition services and economic opportunities.

Ultimately, maternal death is a tragedy for individual women, families, and their communities. The impact of maternal death is felt by the whole family and rebounds across the generations. The complications that cause the death and disability of mothers also damage the infants they carry. The poor health and lack of care that contribute to the death of women in pregnancy and childbirth also compromise the health and survival of the infants and children they leave behind. It affects the family’s well-being and that group’s potential to contribute to the development of the community. It is estimated that nearly two-thirds of the eight million infant deaths that occur each year result largely from poor maternal health and hygiene, inadequate care, inefficient delivery management, and lack of essential care of the newborn. The social costs to the immediate family group are compounded with economic costs to the health care system and missed development opportunities.

MATERNAL MORTALITY IN THE REGION OF THE AMERICAS

What Is a Maternal Death?

A maternal death, according to the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10), is the death of a woman who was preg-
nant at the time of death or had recently been so, and whose death was related directly or indirectly to the pregnancy. Direct maternal deaths are those resulting from complications of pregnancy occurring in the prenatal period, during labor and childbirth, or within 42 days following termination of the pregnancy. Recently, the following has been added: “. . . irrespective of the duration and site of the pregnancy, from any cause related or aggravated by the pregnancy or its management but not from accidental or incidental causes.” Further, maternal deaths are to be reported in two groups: (a) direct obstetric deaths and (b) indirect obstetric deaths. ICD-10 also recognizes late maternal deaths as those deaths occurring up to one year after the termination of the pregnancy. However, the applications of these changes in definition are not uniform among countries, even in those with good registration systems.

Why Do Women Die?

Globally, approximately 80% of all maternal deaths are the direct result of complications arising during pregnancy, delivery, or the puerperium. It should be noted, however, that there is under-reporting of deaths and their causes, and the available databases are weak. The most commonly registered clinical causes of death in Latin America and the Caribbean are characterized below:

• Hemorrhage, especially postpartum, which results in 20% of maternal deaths, is unpredictable, sudden in onset and swift to kill. It can lead to death very rapidly in the absence of appropriate and prompt lifesaving care.
• Hypertensive disorders of pregnancy, particularly eclampsia (convulsions), result in some 20% of all maternal deaths.
• Abortion complications cause 16% of maternal deaths. Laws should ensure the availability of services for the management of abortion complications and post-abortion care. Where abortion is legal, safe pregnancy termination should be made available. National policy can discourage the use of unsafe abortion by providing protection against unwanted pregnancy and establishing national health campaigns to raise awareness of the risks of unsafe abortion and to show how to recognize and seek treatment for abortion complications.
• Complications of pregnancy, responsible for 14% of maternal deaths, include puerperal infections, often the consequence of poor hygiene during delivery or untreated STIs, and prolonged or obstructed labor, caused by cephalopelvic disproportion or by an abnormal positioning of the fetus.

Many of the above medical problems are aggravated by chronic or residual conditions. Of these indirect contributors to death, one of the most significant is anemia, which also is thought to underlie a substantial proportion of direct deaths (particularly those caused by hemorrhage and sepsis), as well as contribute to death by cardiovascular arrest.

The Health Disadvantage

Within the above-mentioned clinical causes, there is a clear relationship between the population and the health care system. A good number of the deaths could have been prevented through timely quality care. Examples of this would be: careful monitoring during pregnancy and the post-partum period; treatment with relatively simple measures and drugs; access to specific services such as family planning; attendance at birth by trained personnel; and attention to cultural and ethnic practices that exacerbate or potentiate problems.

Approximately two-thirds of all pregnant women in Latin America and the Caribbean deliver with the help of skilled attendants. Many women, however, are assisted only by relatives or traditional birth attendants, and many deliver alone. Providing birthing women with a skilled attendant who is able
EVIDENCE IN MATERNAL MORTALITY MEASUREMENT

Trends in Maternal Mortality in Latin America and the Caribbean

Longitudinal data from PAHO from 1960 to 1980 shows that the maternal mortality ratios in all countries have fallen, but the rate of decline has been slow in the less developed countries. There are still vast differences between countries in the Region; more than 10 countries continue to suffer maternal mortality ratios greater than 100 per 100,000 live births (see Figure 1).

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.

- The maternal mortality ratio represents the obstetric risk associated with each pregnancy, described as the number of maternal deaths per 100,000 live births during a one year period. Although it has traditionally been called a rate, this is actually a ratio and is now usually called such by researchers.
- The maternal mortality rate measures both the obstetric risk and the frequency with which women are exposed to this risk, and is calculated as the number of maternal deaths per 100,000 women of reproductive age (usually 15–49 years) during a given period.
- The lifetime risk of maternal death takes into account both the probability of becoming pregnant and the probability of dying as a result of that pregnancy, accumulated across a woman’s reproductive years. The lifetime risk is calculated using the maternal mortality ratio and the total fertility rate, increased by 25% to allow for pregnancy wastage.
Because the term “ratio” and “rate” are often used interchangeably, for the sake of clarity it is essential to specify the denominator used when referring to either of the first two measures of maternal mortality.

The setting where the problem of maternal mortality is most acute is precisely that in which it is least likely to be accurately measured. Of the 600,000 maternal deaths that occur yearly around the world, most occur in developing countries. If we focus on the Region of the Americas, in Canada the maternal mortality ratio averages about 4 maternal deaths per 100,000 live births (1995); in contrast, in Latin America and the Caribbean the ratio is nearly 20 times higher. Because the maternal mortality ratio represents a measure of the obstetric risk every time a woman becomes pregnant, the risk of maternal death is magnified in areas where women have many pregnancies in their lifetime.

In developing countries, 1 woman in 12 may die of pregnancy-related causes, compared with 1 in 4,000 in industrialized countries. The discrepancy between these two figures not only represents one of the starkest and most telling differentials in development, but also reflects the huge differences in national commitment between different developing countries.

In the Region of the Americas, a woman’s lifetime risk of dying during pregnancy and childbirth ranges from 1:17 (Haiti), to 1:510 (Panama), to 1:3,700 (USA), and to 1:7,000 (Canada). These disparities can be largely explained by poor access to quality care.

Measurement Limitations

As experience with implementing “safe motherhood” programs has grown, it has become increasingly clear that the traditional indicator of maternal health status—the ma-
ternal mortality ratio—is not an appropriate indicator for monitoring progress in the short term. Maternal mortality ratios are inappropriate for short-term monitoring:

- The maternal mortality ratio is not sensitive to changes in the delivery of care and, therefore, is not very useful as a monitoring tool.
- Few developing countries have the sophisticated and comprehensive systems of vital registration needed to accurately monitor levels of maternal mortality. In such circumstances, household surveys have to be used to estimate maternal mortality.
- Maternal deaths are relatively rare events even where maternal mortality is high. Thus, all household survey techniques are subject to wide margins of error and 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.

**Surveillance Issues**

As a result of the measurement limitations and for other technical reasons, most maternal mortality reduction programs now rely on process indicators for regular program monitoring. Such process indicators can include the number and distribution of essential obstetric-care services, the proportion of deliveries attended by skilled health care providers or occurring in institutional settings, or the rates of operative delivery and institutional case fatality rates.

Guidelines have been developed to assist countries in gathering, analyzing, and interpreting such indicators. These process indicators describe the major pathway to reducing maternal mortality in terms of access to essential obstetric care, 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 also permit policy-makers and planners to better target interventions to reduce maternal mortality and morbidity. They often are derived from routine data or as part of program implementation, thus limiting data collection costs.

While process indicators such as these are useful for monitoring programs, more detailed investigation is needed to diagnose the underlying causes of maternal mortality and to identify ways of dealing with them.

Maternal mortality is under-reported worldwide, and most of the figures reported for developing countries are estimates. Surveys done in Latin America and the Caribbean show that we should multiply our reported rates by a factor between 1.5 and 2.3.

In Argentina in 1995, Elida Marconi used a systematic process to reduce misclassification by matching death certificates to clinical records, and found that the extent of misclassification for the country as a whole was 53%. Consequently, official estimates of maternal mortality should be adjusted by a factor of 1.53 to correct for errors in classification.

To describe the Brazil experience, Ruy Lurentis compared the official maternal mortality ratio of 44 per 100,000 live births to the study’s finding, a ratio of 99.6 per 100,000 live births. This meant that there was an under-reporting of 65.9%, which requires an adjustment factor of 2.26 when all factors are considered.

Recent research has highlighted the extent of under-reporting and misclassification of maternal deaths, even in countries with good vital registration (Atrash et al., 1995). Research in the USA, which used six different sources in addition to published vital records to iden-
tify deaths related to pregnancy, also detected significant under-reporting. No single source of information identified all maternal deaths.

In some countries, there is a tendency to report higher levels of maternal mortality where there is an expectation of receiving funding for program activities, and to report lower levels when it was necessary to demonstrate success. These tendencies aggravate the inaccurate reporting.

DALYs (Disability Adjusted Life Years) measures are a time-based indicator of health outcome that forms a composite measure of the overall burden of disease due to losses from premature death and non-fatal disability. DALYs are the measurement unit for the global burden of disease study (GBD); they have been designed to assist with cost effectiveness analysis and are used as a tool for priority setting. This single outcome measure has limitations because only a restricted number of dimensions of health care can be taken into account. Some experts have expressed concerns that the methodology may reinforce a medical model of health care and narrow vertical approaches. DALYs should not be used as the only tool for prioritization or resource allocation. Recommendations are currently being developed to enable DALYs to better capture the burden of reproductive ill health and will be used in the revision of the GBD study planned for 2000.

A CLOSER LOOK AT INEQUITIES

Differences between Men and Women

Health expectancies make it possible to specify inequities between social groups, regions in a country, and sexes. It is increasingly clear that a very strong relationship exists between short life expectancy and amount of morbidity (Robine et al., 1999). Although this relationship has been demonstrated by data in developed countries, no such calculations have been made for Latin American and Caribbean countries. Data from Latin America and the Caribbean, however, show a high mortality and morbidity among females due to reproductive health causes.

Most studies indicate that life expectancy and positive health expectancy are higher for females than for males, but the proportion of morbidity-free years to total life expectancy is slightly lower for females. The difference in life expectancy between the sexes is reduced when an estimate of health expectancy is produced. Results from studies using data from repeated wave surveys have suggested that the greater proportion of years lived with disability or handicap by women may be explained by the longer survival of women after the development of these problems.

Life expectancy in Latin America and the Caribbean has been increasing in all countries over the past decade, but this increase is lower in countries with high maternal mortality, and is also closely linked to education.

Socioeconomic Differences

Socioeconomic differences have been studied for nine countries. All but one of the studies has demonstrated that social inequalities in health are much greater than has been shown by differential mortality. Not only are the poorest and the least educated people shorter-lived, but they also experience a greater part of their lives with disability or handicap. This was first observed in Canada: the difference in life expectancy between the richest 20% and the poorest 20% in the community was 6.3 years, but increased to 14.3 years for disability-free life expectancy.

Finnish and Dutch studies have demonstrated socioeconomic inequalities by means of calculations using several educational levels, and found that the higher the educational level, the higher both life expectancy and positive health expectancy. Kennedy et al. (1996) have shown that race along with other socioeconomic differences are good predictors of excess mortality. Calculations comparing different ethnic groups in the USA show much lower life expectancies and disability-free life
expectancies for black people than for Asian people as compared to whites.

Studies show that socioeconomic differences, including education and race, are closely related to maternal mortality. Although this data is not readily available for Latin America and the Caribbean, infant mortality parallels maternal mortality trends in the region, and some data exist in this area.

Data from Brazil shows a six-fold difference in infant mortality between families in the highest and the lowest income groups, and this difference holds true even for data collected ten years apart (see Figure 4 in the chapter “Health Disparities in Latin America and the Caribbean: The Role of Social and Economic Determinants,” which appears in Part 1 of this publication).

Geographical Comparisons within Countries

Rural Versus Urban Disparities

Data from Guatemala shows that areas with high percentages of indigenous people have higher maternal mortality than other areas. Associated with this increased mortality is lower life expectancy among females, lower availability of water, lower literacy, and lower spending on health services. In general in Latin America and the Caribbean, analyses show that most maternal deaths occur in rural areas. In Guatemala, there are 0.3 hospital beds per 10,000 people in the rural population, compared to 1.3 hospital beds per 10,000 people in the urban population. Such disparities in the distribution of resources can cause inequities in health outcomes such as mortality. There is little direct data reporting on rural/urban differences for most of the countries in LAC. This is in itself an inequity as it prevents and delays action being taken to reach the underserved populations (see Figures 2–6).

Factors resulting in an increased risk of maternal morbidity and mortality also affect the fetus and young child, and frequently result in low birthweight and, later, stunting in children. Using low birthweight and stunting in children as indirect measures of inequalities in maternal mortality risk factors, we can further demonstrate rural/urban differences in Latin American and Caribbean countries. Data from these countries show an almost two-fold increase in low birthweight and stunting in children from rural areas. At the same time, there has been a 68% decline in infant mortality rates in low birthweight babies born to wealthy parents over a ten-year period in Brazil, but only a 36% decline in infant mortality in low birthweight babies born to poor parents (see Figures 7 and 8).

Maternal Mortality and Educational Levels

Maternal mortality is greatest among women with the lowest educational level, 30%–50% of whom never arrive at the health facilities. This is especially true in rural areas.
FIGURE 3. Female life expectancy, according to socioeconomic group, Guatemala.

FIGURE 4. Available water according to socioeconomic group, Guatemala.
FIGURE 5. Female illiteracy according to socioeconomic group, Guatemala.

FIGURE 6. Distribution of hospital beds per 10,000 population according to socioeconomic group, Guatemala.
Data from Chile shows that life expectancy is lowest for women with no education and increases rapidly as the years of schooling increase. Further, this difference has widened over the past ten years. In 1996 the life expectancy for a 20-year-old woman with no education was 53 years, compared to 72 years for a woman with 13 or more years of schooling—a striking difference of 19 years of life expectancy (see Figure 10 in the chapter titled “Health Disparities in Latin America and the Caribbean: The Role of Social and Economic Determinants,” included elsewhere in this publication).

Not only do race and education levels affect maternal mortality and life expectancy,
but they also affect the mortality and morbidity of the children. A recent study from Brazil by Pinto da Cunha (1997) on infant mortality showed that infant mortality was highest for infants of black mothers, decreased for infants of mulatto and dark mothers, and was lowest for infants of white mothers, among mothers with no formal education. This trend persisted consistently as years of schooling in the mothers increased (see Figure 14 in the chapter titled “Health Disparities in Latin America and the Caribbean: The Role of Social and Economic Determinants,” included elsewhere in this publication).

**Economic Inequities**

As described elsewhere in this publication, Latin America is the region with greatest social and economic disparities. In this Region, 60% of the national income is earned by the richest 20% of the population (see Figure 9).

The introduction of extensive economic adjustment and reform programs in the Region, with policies of free trade, currency liberalization, and reduction of government expenditures, has resulted in moderate economic growth since 1990. These changes have not had any significant impact on levels of poverty or on employment. Data show that in Latin America and the Caribbean, the percentage of the population living in absolute poverty has increased, widening the gap between the urban and rural populations. This Region demonstrates a model of growth without distribution (see Figures 10 and 11).

**Income Disparities**

Reduction of mortality in infants under 1 year old is strongly associated with an increase in total available resources in the society. The general data for the Americas in 1996 demonstrates that lower national infant mortality rates correlate with the increase in per capita income adjusted for purchasing power parity.

However, in countries in which per capita income adjusted for purchasing power parity falls below $4,000, the disparities in the internal distribution of income seem to be poorly associated with the level of mortality. In these societies, it seems that the total amount of resources is more a determinant of the health status of the population than the internal distribution of these resources. Although subnational groups with more or less per capita income may exist, the national health status is more associated with the total amount of available resources.

In general, per capita income greatly influences the distribution and utilization of health care resources in Latin America and the Caribbean (see Figure 12 for data for Bolivia and Peru). This is clearly demonstrated by data from Mexico showing that as per capita income increases the percentage of hospital deliveries, and number of physicians and beds per inhabitant increases exponentially (Lozano et al., 1999) (see Figure 7 in the chapter titled “Health Disparities in Latin America and the Caribbean: The Role of Social and Economic Determinants,” included elsewhere in this publication).
In countries whose per capita income adjusted for purchasing power parity falls above the $4,000 threshold, the absolute level of wealth or available resources no longer explains differences in health status. In these countries the infant mortality rate and maternal mortality ratio tend to be higher in the countries with higher income disparities, measured as the ratio of the income of the highest 20% of the population and the income of the lowest 20%. Countries with the highest income disparities have infant mortality rates up to three times higher than those with less disparity.

These examples demonstrate that a country’s overall wealth is not, in itself, the most important determinant of maternal mortality. There are examples of countries with modest levels of GNP and with low income disparities that are coupled with low maternal mortality.

Clearly, in situations where the level of wealth available to the majority of the population is low and the income disparity is significant, access to quality care will be affected and maternal mortality and morbidity will be high.

**Inequity among Countries in Latin America and the Caribbean**

As demonstrated by maternal mortality ratios, the disparities among countries in the Americas are made even more manifest by comparing the ratio of national maternal mortality rates with the regional minimum rate. There is a 14-fold difference in infant mortality rates between the Region’s countries with the lowest infant mortality rates and those with the highest rates. If a similar comparison is carried out for maternal mortality we will see a greater than 100-fold difference in two countries and a 20-fold difference in more than half of the countries in Latin America and the Caribbean. These enormous differences in maternal mortality have much to do with inaccessibility to quality health care. It is important to stress that while a large proportion of infant deaths are due to environmentally related conditions—diarrheal diseases, acute respiratory infections, and malnutrition—maternal mortality is almost wholly attributable to a lack of or poor quality prenatal and perinatal care (see Figure 3 in the chapter titled “Health Disparities in Latin America and the Caribbean: The Role of Social and Economic Determinants,” included elsewhere in this volume).
Actions to Reduce Maternal Mortality

The historical record demonstrates that rapid reductions in levels of maternal mortality can be achieved when key interventions are in place. Ten years of implementing safe motherhood programs has shown that we can advance safe motherhood through:

- improving human rights;
- empowering women and ensuring choice;
- acknowledging that safe motherhood is a vital social and economic investment;
- delaying first birth;
- planning ahead to deal with pregnancy risks since every pregnancy faces risks;
- ensuring skilled attendants at each delivery (this requires national policies favoring professionals with midwifery skills for all births, coupled with standards for quality of care);
- improving access to maternal services by establishing community-based maternal health care systems comprising prenatal, delivery, and postpartum care and a system of referral to a higher level of care when obstetric complications arise; and
- preventing unwanted pregnancy and addressing unsafe abortions.

Countries vary enormously in terms of the situations and challenges they face and in terms of their capacity to address these challenges. However, experience has demonstrated that several features are common to successful efforts to address maternal mortality, such as carrying out:

- coordinated efforts over the long term;
- actions within families and communities, and in society at large;
- actions at the legal and policy level and in health systems;
- interactions among the interventions in these areas, which are critical for reducing maternal mortality and for building and supporting momentum for change; and
- political will to implement change.

There will be a need to support:

- a social, economic, and legislative environment that will enable women to obtain health care and overcome the multiple barriers that reduce their access to this care;
- policies ensuring that all couples and individuals have access to good quality, client-oriented, and confidential family planning information and services that offer a wide choice of effective contraceptive methods—policies should address the regulatory, social efforts to offset economic and cultural factors that limit women’s control over sexuality and reproduction;
- services that assign health workers trained in midwifery to community-based health facilities, thus reducing barriers to access due to distance, lack of transport, and costs of services;
- health care services developed with protocols and statutes for providing routine maternal care and managing obstetric complications at each level of the health system; and
- decentralized services that are as close to people’s homes as possible—particularly in rural and remote areas, facilities must have supplies, equipment, and trained staff.

CONCLUSIONS

Maternal Mortality is an Area of Significant Inequity in Health in Latin America and the Caribbean

If we are to help reduce inequity we must clearly identify the unfair disparities in health that occur in our countries and apply those technologies that reduce those disparities. In the case of maternal mortality, the disparities are multi-faceted and complex. Many factors are outside of the control of the health sector; some are supply-driven while others are demand-driven.

Data from the Region shows that we need to increase access to quality care. Research has
shown that accessibility does not necessarily imply usage. The motivation of the socially disadvantaged to make use of services that are theoretically accessible may not be the same as for the more fortunate groups, even apart from the differences in transactional costs. We initially thought that the socially disadvantaged were more resistant to changing risk behaviors; we now know this is not the case.

Current research shows that issues of respect, confidentiality, auditory and visual privacy in the service areas, dialogue, and sharing of information are as important as the medical therapy being provided in encouraging utilization of resources.

**Improving Access and Quality of Care are Indispensable Interventions for Reducing Maternal Mortality**

Many of our countries in the Region of the Americas are going through an epidemiological transition, have different socioeconomic gradients, and display varying degrees of inequity. Therefore, we need to develop interventions for specific countries by using different approaches.

In the past, data on life expectancy, maternal and infant mortality, and causes of death were seen as sufficient for assessing population health status and determining public health priorities. As mortality rates have declined and life expectancy has increased, questions have arisen about the quality of life. The former indicators remain indispensable, as there are still major inequalities in mortality between countries and between groups within countries. Nevertheless, for a few countries in Latin America and the Caribbean, changes during the last 20 years have demonstrated the need for new indicators, namely disability-free life expectancy, healthy life expectancy, or active life expectancy. These indicators provide information on the functional state and vitality of the population as well as people’s quality of life. These new indicators, which are appropriate for the epidemiological conditions of today, are not seen as a priority and are monitored in only a few Latin American and Caribbean countries, and this is another indication of the inequity among the countries of the region.

**REFERENCES AND BIBLIOGRAPHY**


