

# Global, Regional and National Perinatal and Neonatal Mortality

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## ABSTRACT

Globally, the perinatal mortality rate (PMR) is 53/1000 (7.5 million annual perinatal deaths) and the neonatal mortality rate (NMR) is 36/1000 (5.1 million annual neonatal deaths). Of the 141 million annual livebirths, 127 million (90%) are born in developing countries, which, compared to developed countries, have a higher PMR (57/1000 vs 11/1000, 5.2x) and NMR (39/1000 vs 7/1000, 5.6x). Five million annual neonatal deaths (98% of the world's total) occur in developing countries. Regional annual livebirths figures are: Asia-Oceania 76 million, Africa 31 million, Central and South America 12 million, Europe 8 million, and North America 4 million. Regional annual neonatal death figures are: Asia-Oceania 3.3 million, Africa 1.3 million, Central and South America 0.3 million, Europe 0.07 million, North America 0.03 million. The Asia-Oceania region has a PMR of 53/1000 and a NMR of 41/1000. It has half of the world's livebirths and two-thirds of the world's neonatal deaths. The PMR and NMR have often been used as an indicator of the standard of a country's social, educational and healthcare systems. Strategies, which address inequalities both within a country and between countries, are necessary if there is going to be further improvement in global perinatal health.

**Key words:** Neonatal mortality, perinatal mortality, developing countries

**T**here has been a gradual reduction in global perinatal mortality rate (PMR) and neonatal mortality rate (NMR) over the past decade. Disparities in perinatal health between the five regions (Asia-Oceania, Africa, Central and South America, Europe, and North America) continue to exist, due to differences in their population density and their mix of developed and developing countries. This review examines data on perinatal and neonatal mortality worldwide, makes comparisons between the five world regions, and analyses national differences in the largest of the five regions, Asia-Oceania, which has the greatest number of births as well as neonatal deaths. Data were derived from a variety of sources, including national health service reporting and surveys, and global and regional estimates published by the Maternal Health and Safe Motherhood Programme of the World Health Organization [6].

## Global PMR and NMR

At a global level, the PMR is 53 per 1000 births and the NMR is 36 per 1000 livebirths. Perinatal

mortality refers to death in the perinatal period that includes late pregnancy, birth and the first week of life. This definition avoids conflicting judgments of whether a fetus exhibits signs of life or not at birth, and is therefore a useful measure of reproductive loss for comparison between countries. Neonatal mortality is defined as the death of a liveborn infant during the neonatal period, which begins with birth and extends to the end of the first four weeks of life. Statistics used for international comparison are generally restricted to neonates weighing 1000 g or more at birth in both the numerator and the denominator. At a global level, there are 7.5 million perinatal deaths and 5.1 million neonatal deaths annually. Two-thirds of neonatal deaths (almost 3.4 million) are early neonatal deaths, that is, they occur within the first week of life.

There are 141 million annual livebirths worldwide. The vast majority of births (127 million or 90%) occur in developing countries. Although the overall PMR of 11 per 1000 and NMR of 7 per 1000 are low in developed countries, only 10% of births (14 million) occur in developed countries. In contrast, the PMR of 57 per 1000 and NMR of 39 per 1000 in developing countries, are 5.2 times and 5.6 times higher than that in developed countries. The consequence is that 5 million deaths or 98% of the

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**Table 1. PMR and NMR in the Five World Regions**

World Regions	Annual Livebirths	PMR (per 1000)	NMR (per 1000)	Deaths <28d (per year)
Asia-Oceania	76 M*	53	41	3.3 M
Africa	31 M	75	42	1.3 M
Central and South America	12 M	39	25	0.3 M
Europe	8 M	13	8	0.07 M
North America	4 M	9	6	0.03 M

(\*=Million)

world's total occur in developing countries, while only 0.1 million deaths or 2% of the world's total occur in developed countries.

#### Regional PMR and NMR

Regional annual livebirths and neonatal deaths, as well as PMR and NMR, are shown in Table 1. The Asia-Oceania region is the largest of the five world regions. Its 76 million annual livebirths represent 54% of the world's total (Africa 22%, Central and South America 9%, Europe 6%, and North America 3%). Because of its high NMR of 41 per 1000, it has also the highest number of annual neonatal deaths among the five world regions (3.3 million or 66% of the world's total).

#### PMR and NMR within Asia-Oceania

Of the five sub-regions within the Asia-Oceania region, South Asia has the highest PMR and NMR as well as the highest number of livebirths (Table 2). Its NMR of 51 per 1000 livebirths is the highest of all the geographical regions in the world. The 24 million annual livebirths in South Asia represent 27% of the world's total. Its 2 million neonatal deaths represent a disproportionally high 40% of the world's total.

An examination of the national PMR and NMR of individual countries demonstrates great discrepancies in perinatal health between developed and developing countries. Within the Asia-Oceania re-

gion, there are only five countries that have a PMR below 10 per 1000 and a NMR below 5 per 1000: Australia, Hong Kong, Japan, New Zealand and Singapore. However, the numbers of births in these countries with a more favourable PMR and NMR are relatively low: Australia (260,000), Hong Kong (30,000), Japan (1.3 million), New Zealand (60,000) and Singapore (40,000). In total, less than 1.7 million or 2.3% of the annual livebirths in the Asia-Oceania region are born in these five countries. In contrast, countries in South Asia such as Bangladesh, Pakistan, Nepal and India have a PMR of 65-85 per 1000 and a NMR of 50-65 per 1000. Sri Lanka leads the way in South Asia with a PMR of 25 per 1000 and a NMR of 20 per 1000. The countries in East Asia are predominated by China with over 20 million annual livebirths. It has a PMR of 45 per 1000 and a NMR of 35 per 1000. Excluding Hong Kong and Japan, South Korea has the best PMR and NMR in East Asia of 15 per 1000 and 10 per 1000 respectively. Countries in South-East Asia have a relatively wide range of PMR and NMR. The highest is found in Laos and Cambodia and Laos (PMR of 65-90 per 1000 and NMR of 50-70 per 1000), medium high in Indonesia and Myanmar (PMR of 45-55 per 1000 and NMR of 35 per 1000), and medium low in Vietnam, Philippines and Thailand (PMR of 20-25 per 1000 and NMR of 20 per 1000). Excluding the three countries Australia, New Zealand and Singapore, Malaysia has the best PMR and NMR in South-East Asia (20 per 1000 and 10 per 1000 respectively). Countries in West Asia can be divided into three groups. The first group with the highest PMR and NMR includes Yemen, Turkey, Syria and Iraq (PMR of 40-70 per 1000 and NMR of 30-45 per 1000). The second group, which is medium high, includes Iran, Jordan, Oman and Saudi Arabia (PMR of 30 per 1000 and NMR of 20-25 per 1000). The third group, which is medium low, includes Bahrain, Kuwait and United Arab Emirates (PMR of 20 per 1000 and NMR of 15 per 1000).

**Table 2. PMR and NMR in the five Asia-Oceania Sub-regions**

Asia-Oceania Sub-Regions	PMR (per 1000)	NMR (per 1000)	Annual Livebirths
South Asia	66	51	38 M*
East Asia	41	32	24 M
South-East Asia	37	28	13 M
West Asia	44	27	0.5 M
Oceania	44	24	0.5 M

(\*=Million)

### Significance of PMR and NMR

The PMR and NMR are useful as an indicator of the standard of a country's educational, social and community health systems, the nutritional status of the population, and the national medical programs in obstetric and neonatal care. Firstly, they reflect the effectiveness of social measures in general and community health action in particular. Secondly, they reflect the quality and availability of obstetric and neonatal healthcare services. Overall, they are a measure of socio-economic development of the country. In developing countries, priority is often rightly given to the reduction of post-neonatal infant mortality and childhood mortality. Therefore, it is not surprising that a reduction in NMR has lagged behind the reduction in infant mortality. The fetus and neonate remain neglected by the healthcare system, and interventions to reduce fetal and neonatal deaths are of a low priority. Nevertheless, effective public health actions and inexpensive clinical interventions can be effective in reducing PMR and NMR that will contribute to an improvement in later infant health. In developing countries with a high NMR, most mortality and morbidity in the neonatal period are caused by conditions that can be prevented or treated. The three main causes of neonatal mortality in developing countries are asphyxia, infection and birth trauma. In most cases, the mortality and morbidity are avoidable. Early detection and management of perinatal sepsis, timely diagnosis and appropriate treatment of antepartum and intrapartum asphyxia, safe and clean delivery, meeting the physiological needs of neonates at birth, and prevention and adequate management of neonatal infections are interventions that are available, attainable and cost-effective. The World Health Organization definition of appropriate technology is one which is scientifically sound but acceptable to users, providers and decision makers, simple in design and execution, that fits with local cultures and can be further developed locally at low cost [3].

### Strategies to improve PMR and NMR

A ten-fold difference in PMR and NMR between the developed and developing countries is often associated with a ten-fold difference in healthcare expenditure per capita. For example, among the highest ranking nations in the Asia-Oceania region are Japan (\$1760), Australia (\$1600), New Zealand (\$1390), Korea (\$860) and Singapore (\$750), while among the lowest ranking nations are China (\$74), Pakistan (\$71), Indonesia (\$56) and Nepal

(\$41). Nations in between include Thailand (\$327), Malaysia (\$202), Philippines (\$101), India (\$84) and Sri Lanka (\$77). Furthermore, in many developing countries, there is maldistribution of healthcare resources in that a great proportion of the limited budget that are spend in the provision of healthcare reaches only the more privileged members of the community. It is not uncommon to find that 80% of the country's doctors are serving 20% of the population residing in the urban areas. Conversely, only 20% of resources are available to 80% of the population who are residing in rural areas. Even in countries where there is an improving economic condition overall, the gap between rich urban areas and poor rural areas is widening. This is observed in both developed countries and developing countries alike [1, 2].

Strategies that address inequalities within a nation and between nations are necessary if there is going to be a further improvement in global perinatal health in the present century. Currently, developed countries often give less than 0.5% of their Gross National Product (GNP) to developing countries. A target for the governments of affluent nations facing up to their global responsibilities is to contribute at least 1% of their GNP to developing countries. A tension exists between the provision of what is regarded as good healthcare to all and freedom of personal choice. Alterations in traditional cultural practices, habits of hygiene, and family size, cannot be rushed and coercion is often required. Several developing countries that have succeeded in making real progress in reducing their PMR and NMR have less personal freedom in birth control measures than those living in developed countries would find acceptable. Each individual's interests are seen as subordinate to the interests of the whole society or country [4]. The obstetrician and neonatologist must often take into account more than the health of the mother and infant and the values and happiness of the parents, when making critical clinical decisions in the course of their care of the mother and neonate.

### Conclusions

Compared to perinatal data from 1983 [5], global PMR has reduced by about 10% in just over one decade. However, the total number of perinatal deaths has remained unchanged, because the number of births had increased. A 35% reduction in PMR has been observed in developed countries (from 17 per 1000 to 11 per 1000), whereas developing countries saw only an 11%

reduction in PMR (from 64 per 1000 to 57 per 1000). The largest world region, Asia-Oceania, only experienced a 7% reduction (from 61 per 1000 to 53 per 1000) over the same period. Preventive interventions in developing countries directed against perinatal asphyxia, infections and trauma, are simple and cost effective. In order to see a significant reduction in global PMR and NMR over the coming decade, it is important for the international community to make a greater effort to support developing countries that wish to improve healthcare delivery to mothers and infants.

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