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Disparities in interventions for child and maternal mortality

Robert I Goldenberg and Elizabeth M McClure

Maternal mortality, stillbirth and neonatal mortality generally occur 10 to 100 times more frequently in the lowest compared to highest income countries; 98% or more of these adverse outcomes occur in low-income countries.(1, 2) In order to focus attention on these differences and to define specific country goals for improvement, the United Nations countries adopted the Millennium Development Goals (MDG).(3) These include MDG-4 to reduce childhood mortality by two-thirds from the 1990 levels by 2015, and MDG 5, which asks each country to reduce maternal mortality by three-fourths from 1990 to 2015.(2) Monitoring this process in the 75 poorest countries is known as the Countdown to 2015.(4)

The interventions likely to substantially reduce maternal, fetal, and neonatal and childhood mortality have been described in detail in various *Lancet* series and elsewhere.(5–7) Using data from country - wide surveys such as the Demographic Health Surveys and the Multiple Indicator Cluster Surveys, an estimate of the utilization of these interventions on a country level or for specific sub-populations can be determined. For example, the percent of pregnant women who received 4 prenatal visits or whose deliveries were attended by a skilled birth attendant can be determined, as can the percentage of children with diarrhea treated with oral rehydration therapy or vaccinated for various infectious diseases.(8)

Disparities in pregnancy outcomes between sub-populations –with the sub-populations defined in different ways- are often discussed.(4, 9) The dissimilarities in rates of adverse birth outcomes between the richest and poorest countries – and especially the striking differences in maternal mortality ratios - are among the greatest health disparities ever recorded. What has also become clear in recent years is that there may be large differences in health outcomes within countries as well.(4, 9, 10) The 2 to 3-fold increase in maternal and infant mortality in black compared to white populations in the US is an example of racial disparity in a health outcome. (10) However, it is now clear that differences within country in maternal and child health outcomes can be attributed to more than race alone. Low-income women and children generally have worse outcomes than higher income women and children and rural women and children generally have worse outcomes than urban women and children.(3) The reasons for the disparities are often obscure, but in part may relate to differences in use of health care and access to specific interventions.

Intervention coverage may be defined as the proportion of individuals who need an intervention who actually receive it. For example, if the condition is pregnancy and the intervention is presence of a skilled attendant at delivery, the denominator would be all pregnant women and the numerator all women who received the intervention. Coverage for a childhood vaccine could be calculated in a similar fashion. Coverage with oral rehydration salts would consider children with diarrhea as the denominator and those who received the salts as the numerator. Components of coverage include the concepts of penetration and

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utilization. Penetration is usually defined as availability of the intervention where care is being delivered, e.g. is magnesium sulfate available in the hospital where women are treated for preeclampsia? Since in many situations an intervention is available, but not used, this metric is insufficient to define coverage. Instead, coverage is considered as the product of penetration and actual utilization. If in a geographic area, 50% of the hospitals had a particular treatment, and this treatment was used for 60% of cases in these hospitals, coverage for this treatment would only be 30%. Since in many low-income countries, care for pregnant women and children is provided in the home, clinic or hospital, to understand coverage for a particular intervention in a geographic area, one would need to consider how many women or children receive care in home, clinic or hospital and for each location, the penetration and utilization (coverage) for that intervention. The extent of coverage for an intervention may be influenced by many factors, including perceived efficacy, cost, ease or complexity of use, cultural factors and policy decisions at various levels of the government and health system.

Interventions can be classified in many ways. For example, interventions may be considered preventative, diagnostic or treatment, and are often evaluated in terms of their efficacy (as proven in randomized trials) to achieve a specific outcome. Antenatal corticosteroids to prevent neonatal respiratory distress syndrome in preterm infants can be judged by the success in preventing this condition, as can the use of various vaccines to reduce the prevalence of certain infections. A blood pressure apparatus can be judged by its ability to correctly diagnose hypertension, and antibiotic treatment can be judged as efficacious by its ability to prevent death in newborns with pneumonia. The impact of interventions in practice may differ substantially from the results derived from clinical trials; thus, the effectiveness of the intervention depends on the quality of its delivery. The combination of effectiveness and coverage determines the extent to which an intervention will achieve its intended outcome.

Barros et al, in this issue of the Lancet, report coverage data from recent country-wide Demographic Health and Multiple Indicator surveys for a number of interventions believed to be important in reducing maternal or childhood mortality.(11) Overall, they found important differences in coverage for many of these interventions *between* countries, and also differences in coverage by income level *within* countries. For some interventions - such as having 4 prenatal care visits or being attended by a skilled birth attendant during labor, within country differences in coverage were large. Data considering these and other disparities such as those based on geography (urban/rural) or racial and cultural factors can be used by country policy makers to better understand factors contributing to adverse pregnancy outcomes and to allocate resources to reduce within country disparities. Using repetitive measures of coverage for the same intervention in the same geographic area, as is possible with repeated Demographic Health and other surveys, can help countries determine programs' impact toward reducing disparities in coverage, progress toward achieving the MDG's 4 and 5, and importantly, where program changes need to be made. The Countdown to 2015 process is an excellent example of the use of rigorously collected data to monitor health programs and improve health outcomes. That similar data can be used both across and within countries to evaluate disparities in care provision makes this process especially valuable.

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