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Big hopes for the children of the world: a review of the Millennium Development Goals

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Abstract The Millennium Development Goals are a set of eight goals drafted by the United Nations in 2000 with the aim of improving the health and welfare of people worldwide. The goals provide specific targets to be met by 2015, using the 1990 basis as a standard. This review presents these goals as they relate to children, discussing progress and future aims. Although not all eight goals specifically address children, each has its own impact on global child health. Thus far, much progress has been made, but increased rates of improvement must be achieved in order to meet the goals by 2015 and improve the health of children worldwide.

Introduction

In September 2000, the 191 member states of the United Nations drafted a set of eight goals to improve the health and welfare of people worldwide.[1] These are the Millennium Development Goals (MDGs) which provide specific targets against which tangible improvements may be measured (Table 1).[2] The United Nations agreed to achieve the MDGs by 2015, using the 1990 basis as a standard.[1] As reviewed in this paper, much progress has been made towards achieving the MDGs, but increased rates of improvement will be needed if the goals are to be met within the next 4 years.

Millennium Development Goal 4

Reduce child mortality – Reduce under-5 mortality by two-thirds

The most directly child-related MDG is goal four. Child deaths have been declining steadily since the 1960s,[3] and the rate of progress has accelerated in the past decade.[4] Worldwide mortality of children under 5 has dropped from 11,900,000 in 1990 to 7,700,000 in 2010.[5] Although progress is being made, the rates of decline are not fast enough (Fig. 1).[6] Overall, there has been a 30% decrease in under-5 mortality since 1990.[5] Unfortunately, this means that there must be another 33% reduction in just 5 years to meet MDG four. If the goal is to be reached, a new sense of urgency must be found.[4]

Mortality rates differ widely between countries. In Sweden, for example, the under-5 mortality rate (per 1000) is 2.7, while in Somalia and Chad the rates are 111 and 169, respectively. In many countries there has been a dramatic reduction in under-5 mortality: the rate in India fell from 89 in 1990 to 14 in 2010 (84% reduction in

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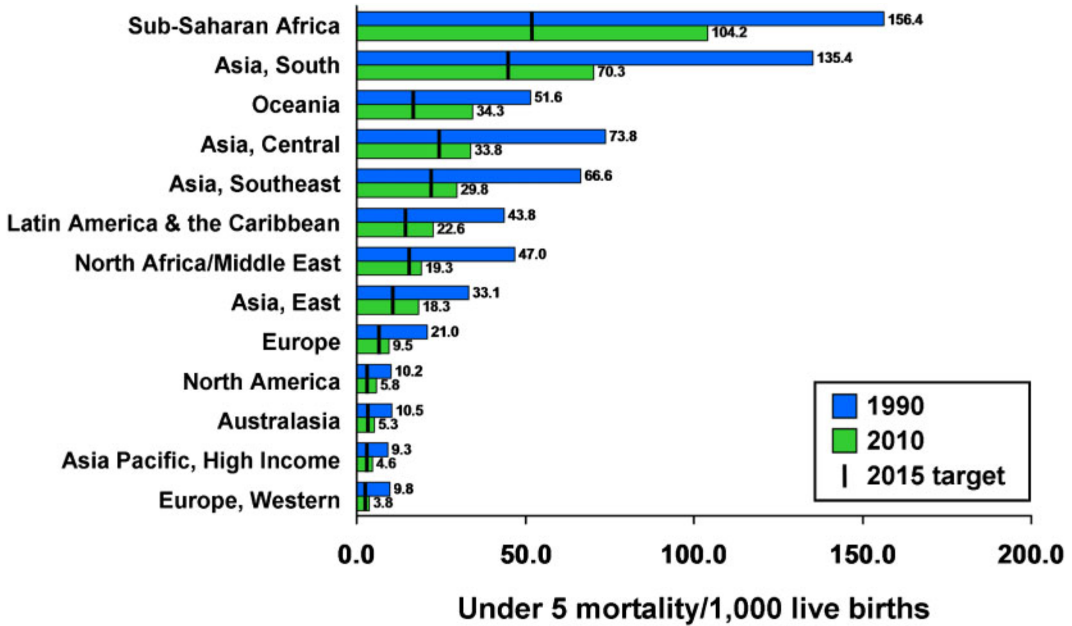

FIG. 1. Under-5 mortality rate per 1,000 live births: 1990, 2010 and 2015 target. (Adapted from WHO, data from Rajaratnam JK, Marcus JR, Flaxman AD, *et al.* Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970–2010: a systematic analysis of progress towards Millennium Development Goal 4. *Lancet* 2010; **375**:1988–2008.[5])

20 years).[5] Elsewhere, however, the decline has been less impressive: Nigeria only declined from 194 in 1990 to 157 in 2010 (19% reduction in 20 years).[5]

In several sub-Saharan African countries such as Botswana, Liberia and Rwanda, rates of decline in mortality have accelerated in the past decade. The success of these countries is even more impressive since the contribution of HIV infection to the under-5 mortality rate varies from 15 to 60%.[7] These 'success stories' set an example for mortality-reduction efforts in countries where improvements lag behind.[2] Working transnationally in the sub-Saharan African countries has enabled best practices to cross boundaries so that countries which are struggling can benefit from the experience of more successful neighbours.

TABLE 1. *Millennium Development Goals and some representative targets.*[2]

Goal	Representative target
1. Eradicate extreme poverty and hunger	Halve proportion of hungry people
2. Achieve universal primary education	Provide for boys and girls
3. Promote gender equality and empower women	Eliminate gender disparity in schools
4. Reduce child mortality	Reduce under-5 mortality by 2/3
5. Improve maternal health	Reduce maternal mortality by 3/4
6. Combat HIV/AIDS, malaria and other diseases	Provide universal access to HIV treatment and halt the incidence of malaria
7. Ensure environmental sustainability	Halve proportion without safe water
8. Develop a global partnership for development	Ensure access to essential medication

There is a large disparity in child mortality (99% of deaths occur in developing countries[8]) and there are large differences between the causes in developed and developing countries. In developed countries such as the United States, the most significant categories of child death are neonatal problems, injury, acute respiratory illnesses and others including cancer. In developing countries, the main causes of death are preventable or treatable diseases: neonatal problems, acute respiratory infections, diarrhoea, malaria, measles, injury and HIV/AIDS.[9] Thus, since 99% of deaths occur in developing countries, the vast majority of child deaths are from preventable or treatable diseases.

If the causes of the majority of child deaths are preventable or treatable, why are so many children still dying? The answer lies in unequal distribution and discrepant use of resources, which leads to a severe lack of available resources at community level in developing countries and leaves millions of children without life-saving health care. However, the wide discrepancies in resource availability between developed and developing countries suggest that significant improvements are within the range of available global resources. In fact, two-thirds of child deaths worldwide could be prevented by interventions that are available now and are feasible for implementation in low-income countries at high levels of population coverage.[10] The key to this is allocating resources more evenly throughout and within nations.

Improvements in child health are closely associated with the availability of basic and cost-effective prevention tools, access to treatment for infectious diseases, access to clean water and adequate sanitation.[11] Use of simple interventions such as immunization and vitamin A supplementation and the use of insecticide-treated mosquito nets to prevent malaria has contributed to recent progress in reducing child mortality.[11] In developed countries, further reductions of under-5 mortality will most likely result from improvements in maternal, perinatal and neonatal care. In developing countries, more basic and complete approaches are needed to reduce mortality.

Although MDG 4 is the most directly related to children, all other goals are related also. The underlying causes of childhood mortality including poverty, undernutrition, inequality, lack of access to care, lack of maternal education and conflicts or war are all related to the seven other MDGs.[12] Thus, achieving all eight goals through a multifaceted approach could lead to improving the lives and health of millions of children around the world.

Millennium Development Goal 1

Eradicate extreme poverty and hunger – Halve the proportion of hungry people

This goal addresses the correlation between wealth and health: economic well-being corresponds with easy access to essential resources such as food, shelter, education and health services. In 2007, at least 200 million children under 5 years of age did not fulfill their cognitive development potential owing to poverty and poor nutrition.[13] Additionally, 35% of child deaths in 2005 were attributed to illnesses resulting from increased susceptibility owing to malnourishment.[14,15]

As the poverty rate dropped from 46% in 1990 to 27% in 2005,[6] the world is on-track to eradicate extreme poverty.[6] However, progress towards halving the proportion of hungry people has been less successful.[6] From 1990 to 2002, the proportion of the world's undernourished population dropped from 20% to 16%.[6] After this point, progress essentially stopped, and 16% of the world's population (equivalent to 830 million people) remains undernourished.[6]

Children represent a disproportionate proportion of the world's undernourished population, and one in four children in the developing world is underweight.[6] Even this relatively high number might be an underestimate because assessing nutritional status using weight measures does not address the

additional burden of stunting.[16] South Asia has the highest prevalence of underweight children at 46% and approximately half of all undernourished children in the world live in this region.[6,14]

The persistence of poverty continues to be the main cause of malnutrition. Countries with the highest prevalence of hunger also have a high proportion of their population living on less than US$1 a day.[14] In 2008, falling income owing to the global financial crisis combined with an increase in food prices further hampered progress.[6,17]

As rapid economic growth can widen the gap between rich and poor, improving economic conditions alone will not be sufficient to resolve hunger. Since the poorest people are more likely to be undernourished, rapid economic growth can increase the number of hungry people.[14,17] Fortunately, policies which focus on delivering health services and treatment to the poor have been successful in helping to combat this inequality.[18,19] International aid groups should also be aware that some well intentioned efforts to help the poor without understanding the local society and culture can actually lead to sustained poverty. And merely giving resources might unintentionally result in disempowerment of population groups and, thus, in increased dependence and prolonged poverty. For example, while individualistic cultures might reason that the fairest way to distribute resources is to give every individual the same amount, some collectivist societies have shown that giving larger amounts of food to certain persons results in more financial success for those individuals who will then share with the community as a whole.[20]

In addition to economic policies designed to improve food access for those living in poverty, undernutrition in children can be reduced by simple interventions in the 1st 24 months of life. Breastfeeding within 1 hour of birth, exclusive breastfeeding for the 1st 6 months of life and micronutrient supplementation with complementary feeding between 6 and 24 months have been shown to improve children's overall nutritional status.[6,17,21] In order to escape the vicious cycle in which poverty begets hunger and *vice versa*, both issues must be addressed simultaneously.

Millennium Development Goal 2

Achieve universal primary education – Provide for boys and girls

Goal 2 aims to ensure that all children, boys and girls, complete primary schooling. Children with a primary education have more income-generating opportunities as adults, and higher levels of education correlate with improved quality of life.[22]

Although enrollment for primary education rose in developing countries from 82% in 1990 to 89% in 2008, this rate of improvement is not sufficient to achieve universal primary education by 2015.[6] Of the 69 million children who were not in school in 2008, 31 million were from sub-Saharan Africa and 18 million from South Asia.[6] Inequalities persist; girls are less likely to attend school than boys and children living in rural areas are twice as likely to be out of school as those in urban areas.[6] Poverty is the most important barrier to obtaining education, and data from 42 countries showed that of all children out of school, 36% were in the poorest quintile while only 10% were in the wealthiest quintile.[6]

A combination of strategies can be used to increase the number of children in school. Decreasing barriers to enrollment has produced large increases in attendance in several African nations. For example, when school fees were eliminated in Uganda in 1997, primary school enrollment increased from 3.4 to 5.7 million children.[23] In addition, initiatives such as school feeding and health programmes provide additional incentives for education.[23] However, the education systems in which these programmes are implemented must be prepared to handle the increased capacity. This includes designing programmes for teacher recruitment and ensuring that learning materials are availabile.[24]

It should be recognised that MDG 2 is only a stepping stone towards improved education overall. Enrollment in school does not necessarily mean that a child is receiving quality education, and post-primary education must improve as well. Improving education will have a positive effect on children and the societies in which they live.

Millennium Development Goal 3

Promote gender equality and empower women – Eliminate gender disparity in schools

Goals 3 and 5 are linked as they strive to improve the rights and health of women. Empowering women will give them the tools and opportunity to improve their health, which in turn will enhance child health and survival. Thus, Goal 3 will result in better health for mothers and children through increased rights and empowerment.

The specific aim to eliminate gender disparity in schools has seen significant advances. By 2005, of 106 developing countries with available data, 83 countries had achieved gender parity in primary and secondary school enrollment.[25] Although this is great progress, gender gaps remain. From 2000 to 2004, 63% of the nearly 140 million illiterate young people were female.[26] Additionally, a recent study has shown that of the 60 million girls who are not in school, nearly three-quarters belong to other minority groups, e.g. tribes or ethnic groups.[27]

The low status of girls and women in many countries threatens their autonomy, dignity and security. It also contributes to gender-based violence which includes abuse of human rights such as domestic violence and sexual abuse of children.[28] Gender-based violence can have health consequences as it is associated with sexually transmitted infections, unintended pregnancy and adverse pregnancy outcomes.[29] This threatens the rights and health of mothers and their children. In addition, gender-based violence has economic consequences. Because of the personal and emotional havoc caused by gender-based violence, girls and women who experience it are less likely to participate in educational and income-generating activities. This reduced participation limits women and perpetuates their low status and lack of rights. Social and economic development are stunted when the rights of women are violated.[30]

Ending gender-based violence will greatly improve the health and rights of girls and women. It will decrease sexually transmitted infections, delay premature pregnancies and increase female participation in education, which will enhance female literacy. Higher levels of female literacy will contribute to more participation in income-generating activities, higher status in society and a reduction in income-related inequalities.[31] This will also better prepare girls for eventual motherhood and child-care roles, enabling them to better care for and provide for their children.

Millennium Development Goal 5

Improve maternal health – Reduce maternal mortality by three-quarters

Improving maternal health is important to children as healthy mothers are better able to care for their offspring. Additionally, maternal mortality is important to child health because children of mothers who die are more vulnerable themselves to early death.[32]

The most accurate way to estimate maternal mortality is widely debated and the lack of set statistics makes it difficult to assess progress towards the goal. However, most nations are nowhere near meeting the target of reducing maternal mortality by 75%, and there is wide variation in progress to meet this goal.[33] There has been a 1.3% yearly decline in maternal mortality since 1990. In order to meet the goal, however, a yearly decline of 5.5% is necessary.[34,35] Furthermore, since 1990 some countries in Asia and North Africa have reduced maternal mortality rates by more than 50%,[1] yet the risk of dying of maternal death in these

countries is still 1 in 31.[1] Since more than 500,000 women die from complications of childbirth each year,[26] large gains must be made in order to meet this goal.

Maternal and newborn health are closely related and often require the same interventions. According to WHO estimates, approximately 536,000 women died from pregnancy-related causes in 2005, and 3.7 million newborns died in 2004.[32] The leading causes of maternal mortality are haemorrhage, sepsis, unsafe abortion, obstructed labour and hypertensive diseases of pregnancy.[32] In sub-Saharan Africa, HIV and malaria are additional important causes of maternal deaths. Owing to high fertility rates and the risks associated with pregnancy, the vast majority of maternal deaths occur in developing countries.

It has been shown that only a limited number of interventions can prevent most maternal and newborn deaths. One intervention is increasing access to prenatal care. Although it has never been proven to directly affect maternal mortality, prenatal care helps women establish a relationship with the healthcare system that makes it more likely they will give birth in a facility. This allows them access to key interventions such as the presence of a trained birthing attendant and emergency obstetric care which can help prevent maternal and newborn mortality.[36–38]

Additional interventions to reduce maternal mortality include postnatal visits and antibiotics to treat infections.[11] Fortunately, such strategies are already in place, but much remains to be done, and reducing maternal and infant mortality depends on an integrated response with increased global focus.

Millennium Development Goal 6

Combat HIV/AIDS, malaria and other diseases – Provide universal access to HIV treatment

Improvements in child health are highly associated with the availability of basic, cost-effective prevention tools and with access to treatment against infectious diseases such as HIV/AIDS, malaria, measles, pneumonia and diarrhoea. These diseases are significant causes of under-5 deaths worldwide.[11,39]

Many of these diseases can be combated with existing interventions. One example is the pneumococcal polysaccharide conjugate vaccine which can prevent pneumonia. Pneumonia is the leading vaccine-preventable killer of children under 5 so efforts to increase vaccination are saving many child lives.[40] Additionally, rotavirus vaccines, zinc supplementation and oral rehydration therapy have been combined to reduce mortality caused by diarrhoea in children.[41]

Prevention of mother-to-child transmission of HIV is important in reducing child mortality and can be achieved through the prompt administration of antiretroviral treatment to HIV-infected pregnant women and their newborns. In addition, insecticide-treated bed-nets have been shown to effectively reduce malaria infection in pregnant women and children.[11]

These interventions have led to some great successes, although much progress has yet to be made. The number of African children protected by insecticide-treated bed-nets increased from 1.7 million in 2000 to 20.3 million in 2007.[42] The number of children receiving antiretroviral treatment increased from 75,000 in 2005 to 275,700 in 2008.[43] However, this still left 62% of children under the age of 15 with HIV in low- and middle-income countries without treatment.[43] Thus, there is still progress to be made and sustained efforts are essential to ensuring that the number of children who die from these diseases continues to fall.

Millennium Development Goal 7

Ensure environmental sustainability – Halve the proportion without safe water

Goal 7 involves preserving natural resources and reducing the loss of biodiversity. The

target to halve the proportion of the world's population who do not have access to safe drinking water and basic sanitation has the most direct impact on child health.[44] Children under 5 bear over 90% of the total disease burden from water-related diseases.[45]

Overall, the world is on track to reach the safe water goal. North Africa, Latin America and East and Southeast Asia have already met the target.[6] Although rural households continue to have poorer access to safe water, rural drinking water coverage increased from 60% in 1990 to 76% in 2008.[6] Unfortunately, less progress has been made towards basic sanitation and, in 2008, 48% of people in developing regions still lacked basic sanitation.[6]

Multi-faceted approaches which involve partnership between agencies and local governments have proved successful in East Asia where most progress has been made.[6,44] It is important that countries devote resources to designing projects with stakeholders within the community. Additionally, countries must target investments towards the poor.[44,46,47] Commitment to providing safe water and basic sanitation must extend not only to the MDG target but beyond it also.

Millennium Development Goal 8

Develop a global partnership for development – Ensure access to essential medication

Goal 8 centres around the relationships between developed and developing countries and between public and private sectors. The target that most directly affects child mortality is ensuring access to affordable medication.[48] To succeed, the two components of this target, access and affordability, require commitment and cooperation between pharmaceutical companies and governments in all nations.[49]

There has been no clear progress since 2007 towards improving access to affordable medication.[50] On average, median prices for drugs in developing countries are 2.7 times higher than international reference prices in the public sector and even less affordable in the private sector (6.3 times higher than international reference prices).[50] Although in many countries medicine is free in the public sector, availability is poor.[51] In 2008, an estimated 58% of people who needed antiretroviral treatment for HIV did not receive it. The situation was worse for children younger than 15 years as only 38% of the 730,000 children with HIV in low- and middle-income countries who needed treatment received it.[43]

Improving access to affordable medication is challenging for reasons which include poor economic incentives for pharmaceutical companies in developing nations, patent protections that increase the price of brand name drugs, inadequate health care systems, poor public financing of research, and the recent global financial crisis.[50,52] Mechanisms to combat these problems have been proposed, including subsidies to encourage the research and development of drugs specifically for diseases affecting low- and middle- income countries, price negotiation between developing countries and pharmaceutical companies, and improvements within the public health system to make medications more widely accessible.[49,50,52,53] In addition to improving access, countries must be able to regulate counterfeit and substandard drugs. Many developing countries lack the resources to apply and reinforce standards for drug production, and some developed countries may not employ strict regulation of exported pharmaceuticals.[54] The cooperation required to achieve Goal 8 underlies the achievement of all the other MDGs and, although some progress has been made, there must be much more.

In conclusion, it can be seen by looking at each of the eight Millennium Development Goals as they relate to children that it will be necessary to achieve all of them if child mortality is to be substantially reduced. This will require specifically targeted

goal-meeting activities combined to achieve greater health and survival for children. In meeting the MDGs, an additional *four million children* per year will survive childhood and grow to potentially contribute positively to their communities. Now *that* is a goal worth striving for.

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