Achieving the millennium development goals for health Time to reassess strategies for improving health in developing countries

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Making best use of resources is vital in developing countries that are struggling to improve public health with limited funds. The WHO-CHOICE project has developed standardised methods to evaluate the efficiency of a broad range of interventions. This series starts by assessing the problems with strategies for meeting the millennium development goals. Subsequent articles describe the methods, apply them to maternal and neonatal health, child health, HIV and AIDS, tuberculosis, and malaria, and consider the implications for an overall health strategy. All appear on bmj.com this week.

A girl born today in Malawi is 35 times more likely to die before reaching the age of 5 years than a girl born in the United Kingdom. If she reaches her fifth birthday, she can look forward to a life in which she has a 37 times greater chance of contracting tuberculosis than her British counterpart and is 180 times more likely to die during pregnancy or childbirth.¹ Malawian girls can expect a life span of only 42 years, 39 years less than that of British girls.¹ These differences are typical of the health gaps between rich and poor countries. Contributing factors are numerous and complex and include poverty, low levels of education (particularly for women), environmental hazards, limited access to health services, and the low volumes, unpredictability, and volatility of aid flows. In recognition, after a decade of discussion, 189 countries committed to accelerate development in poor countries by endorsing an interrelated set of development goals, outlined in the Millennium Declaration of September 2000.²

Health goals

Improving health received considerable prominence in the millennium development goals. Three of the eight goals focused on reducing key causes of mortality in poor countries: maternal and perinatal conditions, diseases affecting children and infants, and the major communicable diseases (box 1). These remain priorities, although non-communicable diseases and injuries are increasingly important even in poor countries (table 1).

Targets and indicators for each goal were developed to help monitor and evaluate progress (table 2). Tuberculosis is the only disease other than HIV and AIDS and malaria specifically mentioned in the last health goal.

Table 1 Leading causes of death in developing and developed countries, 2000⁴

	Proportion of deaths (%)
Developing countries	
Lower respiratory tract infections	17
HIV and AIDS	16
Ischaemic heart disease	16
Perinatal conditions	11
Diarrhoeal diseases	9
Cerebrovascular disease	9
Malaria	7
Tuberculosis	6
Chronic obstructive pulmonary disease	5
Measles	4
Developed countries	
Ischaemic heart disease	40
Cerebrovascular disease	23
Cancer of tracheal, bronchus, and lungs	8
Lower respiratory tract infections	6
Chronic obstructive pulmonary disease	6
Cancers of colon and rectum	5
Diabetes mellitus	3
Self inflicted injury	3
Hypertensive heart disease	3
Stomach cancer	3

The millennium development goals have been criticised on several fronts: that they are too ambitious and therefore unrealistic, so people are not motivated to achieve them; that the agreed indicators cannot be measured meaningfully, making it impossible to monitor progress; and that the focus on communicable diseases does not acknowledge the growing epidemic of non-communicable diseases in developing countries.^{5 6}

Members of the WHO-CHOICE Millennium Development Goals Team are on bmj.com

This article is part of a series examining the cost effectiveness of strategies to achieve the millennium development goals for health

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Despite this, the goals have gained widespread acceptance as a framework to guide increased efforts to achieve economic and social development and measure progress.⁶⁻⁸

Progress

In September 2005, five years after signing the millennium declaration and a third of the way to the 2015 target date, heads of state gathered at the UN to review progress and reaffirm their commitment to the goals.² Documents outlining progress have been published,^{6 9 10 11} but box 2 provides a summary of the most important global trends. Statistical details for sub-Saharan Africa and South Asia are on bmj.com.

A few countries have made significant progress in selected areas. Bangladesh is one of the poorest countries in the world, yet its maternal mortality has fallen steadily, from 514/100 000 live births in the late 1980s to 382/100 000 in 2001.^{13 14} In Egypt, maternal mortality fell by 50% in only eight years.⁹ However, progress has generally been disappointing, particularly in sub-Saharan Africa, where life expectancy has actually fallen in many countries.¹⁵ Wars, political instability, and corruption have all contributed in different

Box 1: Millennium development goals³

Eradicate poverty and hunger
Achieve universal primary education
Promote sex equality and empower women
Reduce child mortality
Improve maternal health
Combat HIV and AIDS, malaria, and other diseases
Ensure environmental sustainability
Develop a global partnership for development

settings, but a common factor has been the lack of resources.

Total health expenditures per capita (from all sources including government, households, firms, and external donors) did not reach \$20 (£11; €18) in 29 of the poorest countries and was under \$10 in 13 of them in 2002.¹⁶ An additional \$13-25 per person a year is required immediately, something that is not feasible without substantially increasing external aid for health (box 3).¹⁰ Even though external flows have increased steadily recently, and the signs are promising that donor countries will increase their commitments further,¹⁸ it is not yet clear that funding will reach the necessary levels or be sustained in a stable and predictable manner.

Recognising that current and projected levels of funding are insufficient to provide even a minimum set of health services in low income countries has two implications.¹⁶ Firstly, if countries are to have any chance of achieving the millennium development goals, they need to re-evaluate existing strategies to determine whether more could be achieved with the resources already available. Indeed, they are likely to be able to achieve more immediately by replacing less effective strategies with more effective ones. Secondly, countries need to have a clear plan on how additional funds will be used to maximise their chances of attaining the goals. Improving efficiency may have an important additional pay-off; it is easier for countries to attract more external funding if they can show they use current resources well.

Achieving more with available resources

Most countries have the potential to achieve more with the available resources, by reducing waste and changing the activities.¹⁹ Some information on the effectiveness and costs of interventions targeting these conditions is already available.²⁰⁻²³ However, much of it has limited practical value to policy makers except in specific settings. Most studies have examined the cost effectiveness of different ways of spending small increases in resources. Although this is useful, it does not tell us whether the resources currently devoted to the conditions are being used as effectively as possible.

Another problem is that the studies have evaluated single interventions in isolation from other related activities that take place, or could take place, at the same time. Some have evaluated more than one intervention,^{22 24} but they have not typically considered the interactions that occur when interventions are conducted concurrently. This can provide misleading evidence. For example, both the effectiveness and costs

TDR/WHO

Use of bed nets is important in combating malaria

Table 2 Targets and indicators for millennium development health goals³

Goals and targets	Indicators
Reduce child mortality	
Reduce by two thirds, between 1990 and 2015, mortality in under 5s	Mortality in under 5s Infant mortality Proportion of 1 year old children immunised against measles
Improve maternal health	
Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio	Maternal mortality ratio Proportion of births attended by skilled health workers
Combat HIV and AIDS, malaria, and other diseases	
Have halted by 2015 and begun to reverse the spread of HIV and AIDS	HIV prevalence among pregnant women aged 15-24 years Condom use as proportion of overall prevalence of contraceptive use among currently married women aged 15-49 Ratio of school attendance for orphans to non-orphans aged 10-14 years
Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases	Prevalence and death rates associated with malaria Proportion of population in malaria risk areas using effective malaria prevention and treatment measures Prevalence and death rates associated with tuberculosis Proportion of people with tuberculosis detected and cured under DOTS (directly observed treatment short course)

Box 2: Progress towards millennium development health goals: highlights

Child mortality—Reductions in child mortality slowed in the 1990s in sub-Saharan Africa and southern Asia. These regions together account for over 80% of global child deaths.⁹

Maternal mortality—Deaths have fallen substantially in countries with moderate to low levels of maternal mortality, but not in countries with the highest mortality. The chance of a woman dying during pregnancy or childbirth over her lifetime is as high as 1 in 16 in sub-Saharan Africa, compared with 1 in 2800 in the developed world.⁶

HIV and AIDS—Prevalence and deaths have increased in all regions of the world since 1990. In sub-Saharan Africa, 7 out of 100 adults are infected with HIV, and in some countries over 25% of the adult population is HIV positive. Although prevalence seems to have stabilised in the region since 2000, it remains high. This does not mean that the epidemic has been controlled, more that the increasing number of AIDS deaths each year roughly matches the number of new infections.⁹ Globally, 4.9 million people were newly infected with HIV in 2004 and 3.1 million died from AIDS

Malaria—Over a million die each year from malaria, most of them African children. Total deaths have increased since the late 1980s, probably because of the spread of drug resistant organisms across Africa.¹² Prevention and treatment measures have improved recently, but this is yet to be translated into a reduction in deaths

Tuberculosis kills 1.7 million people a year. The number of new cases has been growing by about 1% a year, with the fastest increases in sub-Saharan Africa and the former Soviet states. In 2003, there were nearly 9 million new cases, including 674 000 among people with HIV. Less than half of cases are currently detected and treated⁹

of active case finding and treatment for malaria will depend on whether impregnated mosquito nets are widely used and whether there is a programme of indoor residual spraying with insecticide. The costs of undertaking two of these activities together cannot be assumed to be the sum of the costs of each intervention evaluated separately; nor can the effectiveness be summed, as is implicitly assumed in the existing literature. To provide practical information for priority setting, each intervention should certainly be evaluated individually, but then the joint costs and effects of undertaking interventions in various combinations should be incorporated.

Published studies also often use different methods, making it difficult to be sure that reported differences in cost effectiveness do not simply reflect methodological variation. In addition, the available information is mostly based on studies using an incremental approach, examining the cost effectiveness of small changes to current practice. To achieve the millennium development goals needs large increases in coverage. This requires explicit consideration of how costs and effects will vary with increasing coverage, something that has rarely been done.

Five years after the signing of the millennium declaration, it is both opportune and important to reassess current strategies and plans. We have used the best available evidence on costs, coverage of

intervention, and effectiveness to identify the most effective and efficient mix of interventions for each disease or condition in the health millennium goals, and the *BMJ* will publish these analyses over the next few weeks.²⁵⁻²⁹

WHO-CHOICE project

All the papers use a standardised method developed as part of the World Health Organization's Choosing Interventions that are Cost Effective (CHOICE) project.³⁰ The method is designed specifically to incorporate interactions between concurrent interventions.^{19 31 32} It allows evaluation of the costs and effects of the current set of interventions—defined as any preventive, promotive, curative, or rehabilitative action that improves health. It also allows an assessment of what types of interventions or activities would be desirable should new resources become available. The effect of scale on costs and effectiveness is incorporated by evaluating every intervention, and every combination, at three standard levels of coverage: 50%, 80%, and 95%.

It would be ideal to undertake this type of analysis for each country individually, but no country has yet been able to evaluate all possible health interventions in its own setting. With 192 countries members of WHO, it is not feasible for us to do this work at the country level either. On the other hand, a single global estimate does not account for the diversity of risks to health, population structures, epidemiology, and costs across countries and is of limited value to policy makers. As a compromise, we have done the analysis for 14 regions of the world, grouping countries by geographical proximity and rates of child and adult mortality.

The CHOICE project is now testing a contextualisation tool that allows countries to modify the regional results to their settings. The tool automatically changes the regional population size, age, and sex structure to those of the country. Local analysts can modify any of the variables, for any disease or condition, depending

Box 3: How scarce are resources available to achieve millennium development goals?¹⁰

- Based on a study of five low income countries, the UN Millennium Project estimated that a typical low income country would need to invest \$70-80 per capita in 2006, increasing to \$120-160 by 2015, to achieve all eight goals
- The requirements for the health goals are \$13-25 per capita in 2006, rising to \$30-48 per capita in 2015
- \$73bn in external assistance would be needed in 2006 (approximately \$18.25bn for health)
- External assistance for health has increased from \$7bn in 2000 to an estimated \$14bn in 2004. A high proportion of the increase was provided by US President Bush's emergency plan for AIDS relief initiative¹⁷
- Only 25% (2-45%) of total external assistance in 2002 arrived in countries and was used on activities related to the goals. Much is used for technical support*

*Based on our calculation using information in table 17.1 of the UN Millennium Project report.

Summary points

The poorest countries will not achieve the health millennium development goals at current rates of progress

Although aid will hopefully increase, it is critical to assess whether current resources are being spent in the best way and how best to use new resources

Most studies of cost effectiveness have not considered the efficiency of current interventions and have not incorporated interactions between interventions undertaken concurrently

The WHO analysis provides practical information to help use existing and new resources efficiently

on the availability of local data. When no local data are available, the regional “priors” adapted to the local population size and structure form the basis of analysis. This allows countries to access the best evidence available internationally, at low cost, and in a relatively short time.

Informed choice

Cost effectiveness is an important input to decision making, although we recognise that political interest groups influence the way resources are allocated in practice and that countries have other legitimate goals for the health system in addition to improving population health.³³ The concern with reducing health inequalities is important in most places, for example, and it is reasonable for decision makers to choose a strategy that is not as cost effective as an alternative because it focuses on the poorest. How trade-offs between different social objectives are made is influenced by the value systems of each country, but information on the costs and effects of the various options provides an explicit statement of what is lost in terms of population health if other goals are pursued or political pressures satisfied. We believe this information is generally welcomed by policy makers, and the other articles in this series provide practical suggestions on ways in which the resources devoted to attaining the millennium development goals could be better deployed.

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