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Improving the Health of the Global Poor

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We analyzed the technical basis for a major global program to reduce disease among the poor. Effective interventions exist against the few diseases which most account for excess mortality among the poor. Achieving high coverage of effective interventions requires a well-functioning health system, as well as overcoming a set of financial and nonfinancial constraints. The annual incremental cost would be between $40 billion and $52 billion by 2015 in 83 low-income and sub-Saharan African countries. Such a program is feasible and would avoid millions of child, maternal, and adult deaths annually in poor countries.

Improvements in global health in the second half of the twentieth century have been enormous, but remain incomplete. Between 1960 and 1995, life expectancy in low-income countries improved by 22 years as opposed to 9 in high-income countries. Mortality of children under 5 years of age in low-income countries has been halved since 1960. Even so, 10 million child deaths occur annually, and other enormous health burdens remain. In 1998, almost a third of deaths in low- and middle-income countries (LMICs) (1) were due to communicable diseases, maternal and perinatal conditions, and nutritional deficiencies: a death toll of 16 million, equivalent to the population of Florida. A tenth of those deaths—1.6 million—were from measles, tetanus, and diphtheria, diseases routinely vaccinated against in wealthy countries (2, 3). Of the half million women who die annually due to pregnancy or childbirth, 99% do so in LMICs. About 2.4 billion people live at risk of malaria and at least one million died from it in 1998; there are eight million new cases of tuberculosis every year and 1.5 million deaths. On the basis of current smoking trends, tobacco-attributable disease will kill about 500 million people over the next five decades (4). Over 20 million people have died already of HIV/AIDS, 40 million people are infected currently, and its spread continues unabated in many countries (5). The burden falls most heavily on poor countries and on the poorest of the people within those

countries. Of the 30 million children not receiving basic immunizations, 27 million live in countries with GNP below $1200 per capita. In India, the prevalence of childhood mortality, smoking, and tuberculosis is three times higher among the lowest income or education groups than among the highest (6).

The availability of effective interventions that could improve the health of the poor, and the realization that this could dramatically reduce poverty and increase economic growth, has led to a growing number of calls for a major global program to greatly reduce ill health among the poor (7, 8), the most recent of which is the report of the WHO's Commission on Macroeconomics and Health (CMH) (9). Working Group 5 of the CMH was charged with providing an independent assessment of the focus and costs of a comprehensive program to reduce ill health of the poor. Here, we summarize key findings of Working Group 5 (9) on the range of interventions such a program might seek to scale up; the nature of the constraints that need to be tackled in scaling up; the potential costs and benefits of such a program; and the feasibility of action. In these analyses, we focus

on 83 worst-off countries: those with a per capita gross national product (GNP) of $1200 and below (in 1999 US$), plus the few countries in sub-Saharan Africa with GNPs over this cutoff. These countries are expected to have a population of 4.8 billion in 2015 (10) and include almost all of the world's people living on less than $1 a day.

A Few Health Conditions Matter Most

In high-income countries, death below the age of 30 is rare, and among nonsmokers, death between the ages of 30 and 69 is becomingly increasingly uncommon. Age-adjusted comparisons of 1998 LMIC death rates to nonsmoker death rates in high-income countries reveal large amounts of avoidable mortality, in the sense of premature mortality that would not occur at death rates seen in high-income countries (Table 1) (11). The primary causes of this avoidable mortality are maternal and perinatal mortality, vaccine-preventable diseases, acute respiratory infection and diarrhea, protein-energy and micronutrient malnutrition (12), malaria, tuberculosis, tobacco-attributable disease, and HIV/AIDS. Together, these causes account for nearly 90% of the excess death rates at younger ages in LMICs.

Effective interventions exist against these diseases, as shown in Table 2. Their widespread implementation requires a functioning "close-to-client" health system (13) that ensures delivery of services of good technical quality. Historic experience suggests that three elements are required: local delivery structures (such as health centers and first-

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Table 1. Risk of dying and avoidable mortality (as %) in low and middle-income countries, 1998. Source: (11). Note that LMIC countries include those in Eastern Europe and Latin America with incomes above our US$1200 per capita GNP cut-off for the poorest countries. Analyses that are restricted to regions where low-income countries are the majority show even greater risk of death (not shown).

Risk of dying	Females at ages			Males at ages		
	0 to 4	5 to 29	30 to 69	0 to 4	5 to 29	30 to 69
LMIC (a)	8.2	5.6	26.7	8.6	6.1	35.0
Nonsmoking high-income population (b)	1.0	0.9	12.6	1.2	2.2	19.2
Excess risk of dying (avoidable mortality) in LMIC (c = a − b)	7.2	4.7	14.2	7.3	3.9	15.7
Relative contribution of avoidable mortality to risk of dying in LMIC (d = c/a)	88	84	53	86	63	45

line hospitals) that are adequately equipped and staffed by well-trained and well-motivated health workers; categorical programs to provide technical and financial support against priority diseases (such as malaria); and strengthened management of the health system, including surveillance and monitoring. The Expanded Program of Immunization, Integrated Management of Pregnancy and Childbirth, and Integrated Management of Childhood Illness illustrate the approach to service delivery that is needed (*14*).

Constraints to Scaling Up Coverage

In rich countries, there is almost 100% coverage of childhood vaccinations, skilled attendance at delivery, and widespread access to effective treatments. In contrast, coverage of the most effective interventions is low in the poorest countries. However, a few have

achieved major success in one or more areas. For example, at an incremental cost of about $5 million annually, Malawi has adopted accelerated measles control, and no child measles death has been reported in the last 2 years (*15*). However, widespread coverage of all priority interventions is low in most of the poorest countries (Table 2). Table 2 also shows the CMH coverage targets for 2007 and 2015. These come from best judgements made by experts, with some country-specific adjustments; where the international community has set adequate target rates, these are reflected. Country-specific coverage levels reported over recent years provided the baseline of the analysis.

The most obvious barrier to expanding coverage is the currently low level of expenditure on health. Average annual per capita expenditure on health is $26 (in 2002 US$) in

countries under $1200 per capita GNP and all those in sub-Saharan Africa (*16*). In the 48 poorest countries within this list, it is only $13. Moreover, only a minority of these expenditures come from public budgets. The rest are mainly paid out-of-pocket by the poor households, who spend more as a proportion of income on health care than do richer groups (*17*).

Expanding access to successful interventions will thus require additional funds. In most settings it will also require removal of a variety of constraints (*18*). Many, but not all, of these constraints can be "bought out." For example, community- and household-level constraints can be addressed through education of mothers, reducing physical distance to facilities, eliminating user fees, and increasing accountability of health services to communities. A community health worker program in Bangladesh resulted in 30% lower child mortality and 19% lower female mortality versus a control area (*19*). More money can also relieve many local delivery constraints through increasing salary and nonsalary incentives to health workers; increasing staff numbers; improving drug supply, procurement, and logistics; introducing quality assurance methods; strengthening management; and improving regulation of and cooperation with the private sector. In Africa, training of existing staff has tripled cure rates from tuberculosis treatment (*20*).

In contrast, the very highest levels of constraint, those due to overall governance (including corruption, poor rule of law, and armed conflict), are among the most important and the least susceptible to buy-out or short-term amelioration. Overall public policy and governance constraints have been identified as hugely important predictors of the success of developmental assistance (*21*). On the basis of available indicators, which can act as proxies for various kinds of constraints, we categorized countries into four quartiles. Countries in the most constrained quartile have almost twice the child mortality, more than twice the maternal mortality, a third lower immunization coverage, a third as many nurses per capita, and a greater proportion of their population living in poverty. However, only about 260 million people currently live in these highly constrained countries; the rest, more than two billion people, live in places with better governance (*18*).

Costs and Benefits of a Major Scale-Up

In calculating the costs of a major effort to scale up services, it is thus vital to allow not just for the costs of the interventions themselves, but also for the increased delivery capacity required. On the basis of our disease- and condition-specific costs, plus adjustments to allow for overall system expansion and support, the CMH report estimated total costs of achieving

Table 2. Current coverage and minimum coverage goals. Source: Expert opinion; see (*9, 22*) for details, and background papers at www.cmhealth.org/wg5.htm

Condition and interventions*	Coverage		
	Current	2007	2015
Maternal mortality and perinatal conditions†			
Refocused antenatal care	65	80	90
Skilled birth attendance	45	80	90
Childhood mortality			
Immunization services - against polio, diphtheria, pertussis, tetanus, hepatitis B, and Hemophilus B‡	75	90	90
Immunization services - Measles§	68	80	80
Treatment of childhood illnesses - Acute respiratory infection	59	70	80
Treatment of childhood illnesses - Diarrhea	52	70	80
Malaria			
Insecticide treated nets and residual indoor spraying	2	50	70
Treatment for clinical episodes of malaria	31	60	70
Tuberculosis			
Short course treatment of smear positive and smear negative patients	44	60	70
Tobacco-attributable diseases			
Tax greater than 80% of retail price, complete advertising and promotion bans, consumer information, cessation programs	20	80	80
HIV/AIDS and sexually-transmitted infections			
Interventions to decrease sexual transmission ‖	10–20	70	80
Other preventive interventions¶	<1–10	40	70
Palliative care**	6–10	40	70
Highly active antiretroviral therapy	<5	45	65

*Interventions, which are epidemiologically appropriate, are specified for each country. For example, malaria control measures are included only in countries where malaria significantly contributes to the burden of disease, and residual spraying is only costed where it is an appropriate intervention.   †Family planning is an important component of maternal care and also reduces maternal morbidity and mortality from unwanted pregnancies.   ‡Hepatitis and hemophilus B are not included in the calculation of coverage for 2002. Immunization services include provision of vitamin A in deficient areas.   §There is an argument for 90% or greater measles coverage, but we have based our more conservative goal on current expert opinion.   ‖Interventions with sex workers and clients, condom social marketing, workplace and youth interventions, focused media campaigns.   ¶Voluntary counseling and testing, prevention of mother-to-child transmission.   **Prevention and clinical management of HIV-related illnesses, home-based care.

the target 2015 coverage levels as $42 per capita in 2002 US$ (*9*). The CMH report argues that by 2015, around $6 per capita per year would be required in development assistance, most of which would flow to the 48 poorest countries (amounting to $23 per capita for these countries).

Our detailed cost analysis estimated the costs for 2007 and 2015 of expanding coverage of 49 priority interventions (summarized in Table 2) within a close-to-client health system in the 83 worst-off countries. The costs of expanding activities reflect additional expenditure over and above what is being spent today. Costs include both intervention costs and system costs at the local level such as new facilities, management, institutional support, and training (Table 3). Overall additional annual financial needs are $8 to $11 per capita or between $40 billion and $52 billion by 2015 in these countries, if 2015 target levels of coverage are to be reached (*22*).

HIV/AIDS dominates the total incremental costs, constituting a full 49% of the high range of 2015 costs [and 80% for sub-Saharan Africa (*22*)]. HIV prevention (17% of the total costs) will be key to curbing growth of the epidemic. Care and support (14% of the total costs) and highly active antiretroviral therapy (18% of the total costs) can prolong life, improve quality of life, and reduce the number of AIDS orphans, but are unlikely to reduce the spread of the virus. Given that a 10% increase in cigarette tax would raise about

7% additional excise revenue (*4*), smoking control is largely self-financing. There is a strong argument for scaling up the full set of interventions, because often they are complementary (for example, malaria control reduces childhood anemia) and because they share infrastructure costs. For example, access to treatment of childhood illnesses would require extra facilities to meet the needs of the 450 million children below age five in 2015. These facilities would also be used for other interventions.

We compared our coverage goals and expenditures with the health goals within the United Nations (UN) Millennium Development Goals (MDGs). These goals aim to reduce by two-thirds, between 1990 and 2015, the under-five mortality rate; reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio; reverse, by 2015, the spread of HIV/AIDS; and have begun to reduce, by 2015, the incidence of malaria and other major diseases. We analyzed the MDG variables for demographically developing countries using WHO projections (*3*), under optimistic and pessimistic income growth assumptions, adjusting for population growth using the UN Population Division medium projections (*10*). Smoking cessation indicators among the 0.8 billion smokers in low-income countries were added, given that cessation among adults (versus initiation among children) is the chief determinant of reductions in tobacco-attributable mortality over the next few decades (*4*).

Somewhat surprisingly, our analyses

suggest that even in the pessimistic scenarios of slow income growth, all regions would reach the MDG goal for maternal mortality. For example, expanding skilled birth attendance to 80% of the population would avoid about 65% of maternal deaths and reduce deaths to below 200 per 100,000 live births (from the current level of about 800) in Africa, and avoid between 29,000 and 133,000 deaths in 2015 worldwide. In contrast, the MDG target for reducing child mortality appears to be more daunting. Worldwide, a major scale-up of interventions aimed at children would yield huge gains: between 1.9 million and 4.9 million childhood deaths avoided in 2015. However, these figures represent only 44% or 53%, respectively, of the childhood deaths that would otherwise have occurred, falling short of the two-thirds goal of the MDG. Additional efforts to expand access to treatment of childhood illnesses, reduce protein-energy malnutrition, and introduce newer antigens (such as those for streptococcal pneumonia and rotavirus) into immunization services are required to accelerate mortality reductions.

Assuming 70% detection and high cure rates (85% or higher) for tuberculosis, about two million tuberculosis deaths would be avoided in 2015 (*23*). For malaria, improved case management and home treatment, and use of insecticide-treated nets and residual spraying, would avoid between 100,000 to 500,000 childhood deaths in 2015. Increasing cigarette tax to four-fifths of the retail price would roughly double the price of cigarettes in low-income countries, which, along with complete bans on advertising and promotion (*4*), could quadruple smoking cessation rates to about 30%. This would avoid somewhere between 60 to 120 million premature deaths between now and 2050. For HIV/AIDS, even if countries stayed at their current prevalence levels, about 55 million people would be infected with HIV-1 in 2015. But properly targeted prevention programs could prevent this from rising dramatically higher and could thus avoid more than 100 million additional people being infected in 2015.

Can It Be Done?

Early reaction to the CMH plan has included widespread enthusiasm about the desirability of a major program, but also questions about its technical feasibility and concerns about wasting aid money (*24*–*27*). Our careful review concluded that a worldwide effort to increase the access of populations in poor countries to the priority health interventions is both desirable and feasible. There are numerous individual success stories for various conditions, such as the reduction in Thai maternal mortality by three-quarters in the 1960s and 1970s by quadrupling the number of new

Table 3. Annual incremental costs in billions (and per capita) by disease type, in 2002 US$. Source: (*22*). Notes: (i) smoking control is considered self-financing given that higher taxes raise revenue in most settings (*4*), (ii) sixteen countries (population 120 million in 2015) which were included in this cost analysis were excluded from the benefits analysis, as the data for demographically developing regions did not match our cut-off for per capita income. The excluded population represents less than 3% of the total population in our definition of the poorest countries.

	2007		2015		Percent of 2015 high-cost estimate
	Low	**High**	**Low**	**High**	
Maternity-related conditions	2.80 (0.65)	4.48 (1.03)	4.27 (0.89)	6.72 (1.40)	13.0%
Child immunization (including measles)	0.78 (0.18)	1.13 (0.26)	1.04 (0.22)	1.56 (0.33)	3.0%
Treatment of childhood illnesses	3.26 (0.75)	4.13 (0.95)	9.41 (1.97)	11.99 (2.50)	23.3%
Malaria prevention	1.64 (0.38)	2.38 (0.55)	2.76 (0.58)	4.03 (0.84)	7.8%
Malaria treatment	0.37 (0.09)	0.57 (0.13)	0.77 (0.16)	1.24 (0.22)	2.4%
Tuberculosis treatment	0.47 (0.11)	0.62 (0.14)	0.78 (0.16)	1.04 (0.22)	2.0%
HIV prevention	6.18 (1.43)	6.76 (1.56)	7.98 (1.67)	8.69 (1.81)	16.9%
HIV/AIDS care	2.78 (0.64)	2.85 (0.66)	5.82 (1.22)	7.06 (1.48)	13.7%
High-active antiretroviral therapy	4.28 (0.99)	5.78 (1.33)	6.85 (1.43)	9.19 (1.92)	17.8%
All interventions	22.57 (5.21)	28.70 (6.62)	39.69 (8.29)	51.52 (10.76)	100.0%

midwives, the millions of children saved by immunization and case management, and doubling of appropriate tuberculosis treatment. The challenge today is to achieve high coverage of all of the relatively small number of interventions, delivered through a close-to-client health system, and backed up by specific categorical programs offering technical support and by strengthened health systems management.

The second concern, about wasting money, is a real one especially where corruption and poor governance are rife. Most of the burden of ill health, however, lies in countries with fewer severe constraints in their ability to scale up coverage and better governance structures (notable examples are Ghana, India, Senegal, and Uganda). It is true that there are subnational regions that suffer from grievous governance failings, such as several populous states of India and provinces of China; including these would more than double the population living in highly constrained settings. However, the federal structures of those countries enable action in such places: in Bihar, India, federal programs have been able to curtail dramatically both polio and leprosy. Cambodia has been a country noted for poor governance. Yet, it appears to have reduced HIV-1 prevalence by about one-third through scaling up prevention programs for vulnerable groups, and treating sexually transmitted infections (*5*). Moreover, political conditions of high constraint are often transitory. Some years ago, countries such as Uganda and Mozambique would have been found among the most constrained because of civil strife and poor political governance. Today they are not.

A global program would require a large and sustained increase over current levels of expenditure. The CMH calls on poor and rich countries to share the burden. The low-income countries would be responsible for more than half of the increased expenditures for improved health by 2015, whereas donors are called upon to provide $27 billion annually by 2007 and $38 billion annually by 2015, compared with an estimated $6 billion for health in 2001. Such donor funding would need to continue for two or more decades and must include payment for salaries and systems support. The sums also include $4 billion by 2015 for research and development.

Although $27 billion by 2007 is a large amount, it would represent around one-tenth of 1% of the GNP of the donor countries. Overseas developmental assistance is now around $53 billion or just 0.2% of GNP of the donor countries, compared with a long-standing international target of 0.7% of GNP established by the UN General Assembly in 1970, so there is ample room to increase funding for health. Sustained donor financing

is needed to remove the trap of too little money being available to identify and solve constraints to achieving wide population coverage. Recipient governments and leaders must demonstrate the capacity to mobilize more money domestically, channel funds to the poorest within their societies, use funds transparently, and monitor and report outcomes in an accountable way.

To spend money well and achieve desired outcomes, we recommend four specific actions: (i) focused efforts to identify and systematically remove the key constraints that prevent health systems from increasing the coverage of good quality services; (ii) a massive effort with donor financial and technical support to increase the number of skilled health managers; (iii) a similar massive effort to put in place reliable surveillance systems to track trends in the health status of the poor, detect and control new epidemics and outbreaks, evaluate the success of control programs, and improve accountability for expenditures on health; and (iv) a major increase in research on interventions including vaccines, drugs, and behavior change, and on how best to deliver interventions to communities. Within the broad goal of improving health, we emphasize dramatically reducing the half million deaths among women due to pregnancy or childbirth as a particularly effective indicator of a strengthened close-to-client health system.

Such a global program focusing on lifting the poor out of ill health would require extraordinary and sustained popular and political will. For all its challenges, such a program would have a truly profound beneficial effect over the first quarter of the 21st century.

References and Notes

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12. Protein-energy and micronutrient malnutrition are major causes of morbidity and are risk factors for child and maternal mortality. Aside from direct interventions such as micronutrients, infection control is a highly effective way to reduce malnutrition.
13. We define close-to-client as consisting of relatively simple hospitals, health centers, and in some circumstances, smaller health posts and their outreach services, along with the infrastructure and personnel directly responsible for the delivery of interventions through categorical programs. People other than doctors can carry out most of the work: that is, nurses and paramedical staff of various degrees of training, including midwives.
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28. This paper draws extensively on the background papers, consultations, and report of Working Group 5 of CMH. The views represented are of the authors and not those of WHO or the World Bank. Financial support from the WHO, the Bill and Melinda Gates Foundation, the World Bank, and the London School of Hygiene and Tropical Medicine is kindly acknowledged. We thank H. Barnum, M. Claeson, D. T. Jamison, P. Musgrove, and L. Nemer for helpful comments, and I. Sinha for assistance.