# Choosing Interventions: The Role of Health Economics

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## Introduction

The Global Program on Evidence for Health Policy was established in WHO in 1998, with Dr Brundtland being appointed to the post of Director General. The rationale was to strengthen the scientific and ethical foundations of evidence-based health policy development. The program reflects the desire of the Organization to ensure that all its policy recommendations are based on the soundest evidence possible. It also recognizes the need to provide support to policy makers to help them generate and use evidence appropriately.

Some evidence has been widely available for many years and has been incorporated into the design of programs and policies. For example, Figure 1 shows that life expectancy at birth, an indicator commonly used to summarize the health of populations, has improved for both men and women in all regions of the world since the 1950s. However, the pace of improvement has differed with life expectancy in the East Asian and Pacific countries (part of the Western Pacific Regional Office of WHO) catching up to that in Europe and the Americas. At the other extreme,

**Figure1**

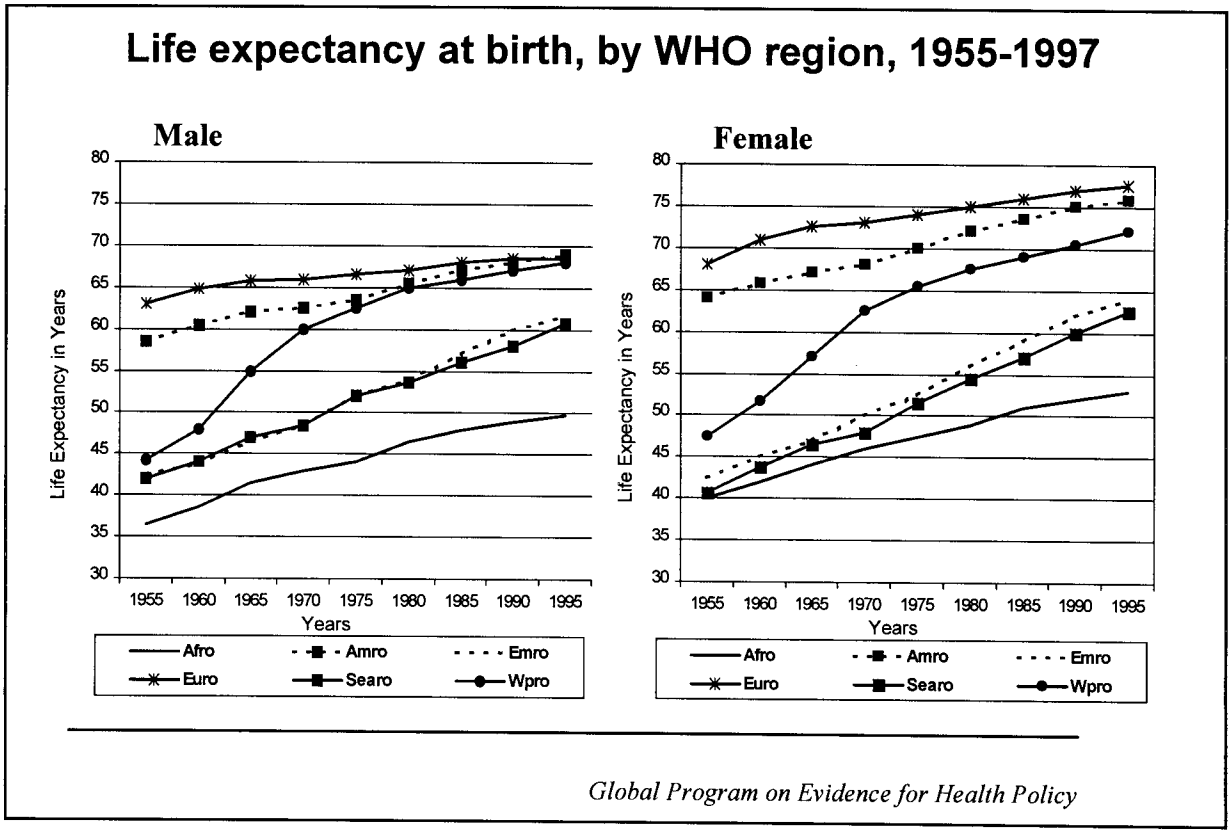
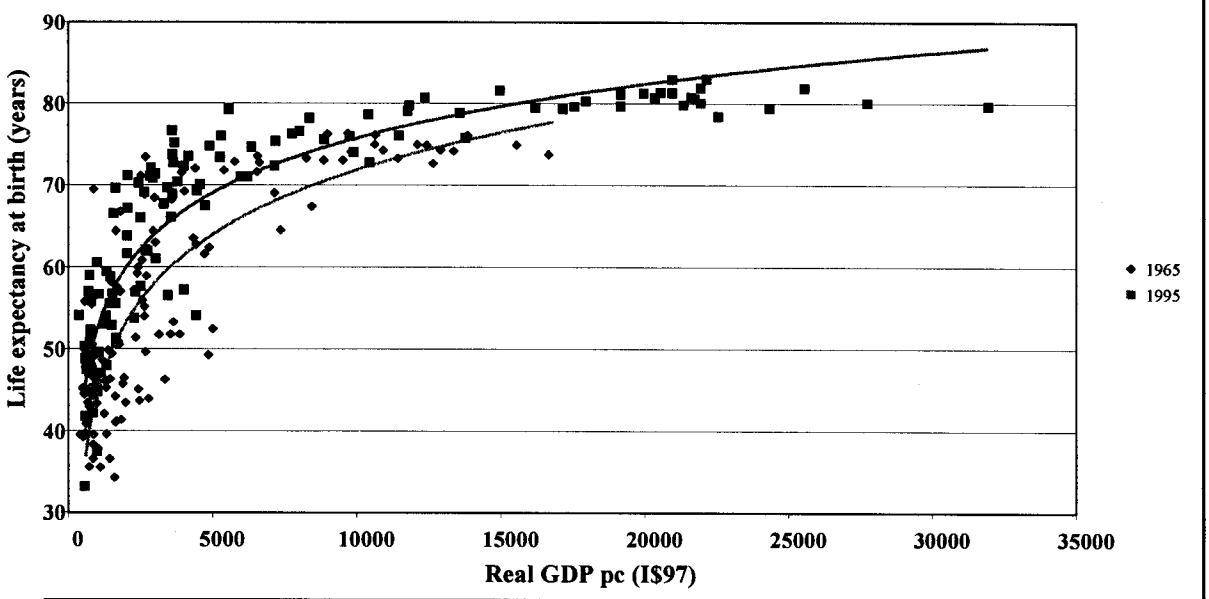


**Figure 2**




***Based on: United Nations Population Division estimates; Penn World Tables***

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the gap between Asia and sub-Saharan Africa in terms of life expectancy has increased. This is one of the reasons that international agencies and bilateral donors have focused increasing attention on sub-Saharan Africa.

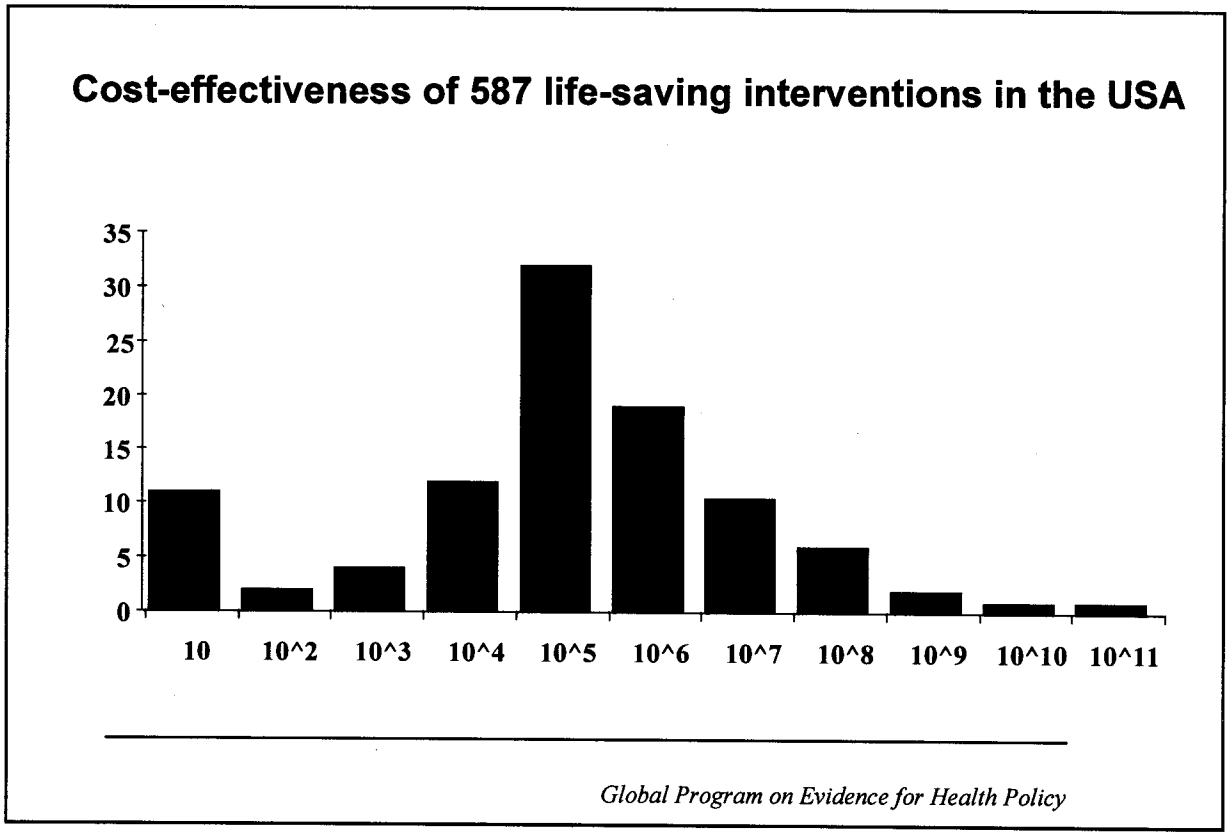
Some of the observed differences in health outcomes can be attributed to differences in income and standards of living. Figure 2 shows the well-known relationship between income per capita and life expectancy at birth for a cross section of countries at two points in time – 1965 and 1995. Income per capita is measured in terms of international dollars (local currencies are converted to dollars using purchasing power parities). As expected, there is a positive, but decreasing relationship between life expectancy as a measure of population health, and income per capita. It is important to note, however, that this relationship has shifted upwards over time (i.e. the curve for 1995 is of the same shape, but higher than the curve for 1965). This has been interpreted as being a result of the increase in scientific knowledge over time that allows all countries to improve health at any given income level. [1,2]

There are three ways in which the health of populations can be improved. First, increasing scientific knowledge will shift the curve upward for all countries. Second, increases in income improve the health of populations. Third, in any time period many countries are below the curve. This implies that for their levels of per capita income, they could be producing more health than they do - as shown by other countries with similar levels of income, which are on or above the curve. This means that they are not transforming income into health as efficiently as other countries. This will be the focus of the remainder of this talk.

## Cost-Effectiveness Analysis

Figure 3 is taken from the work of Tengs et al.[3] who estimated the costs and health effects of over 500 interventions which were routinely undertaken in the US. The term "intervention" was broadly

**Figure 3**




defined to include preventive as well as curative actions designed to improve health. Environmental legislation, for example, aimed at reducing the health impacts of pollution, was included. The vertical axis is the percentage of interventions falling within a particular category while the horizontal axis shows the estimated costs per year of life saved. The scale of this axis is logarithmic. So the first bar shows that just over 10 percent of the interventions had a cost effectiveness of $10 per year of life saved or less, while the next bar indicates that about 2.5% had a cost effectiveness of between $10 and $100 ($10 to the power 2). At the other extreme, some interventions then undertaken in the US cost more than $10 to the power 11, or more than $100,000,000,000 per year of life saved.

Interestingly, it was not possible to say that prevention was always better than cure. Some preventive interventions were very cost-effective, as were some curative interventions. On the other hand, some preventive interventions were very costly ways of improving health, particularly some of the environmental control interventions.

Tengs [4,5] subsequently showed that many of the cost-effective interventions in the US were not fully implemented – i.e. childhood immunizations. If current resources were reallocated from the cost-ineffective set of policies and programs to the cost-effective ones that were not fully implemented, major improvements in the health of populations would occur. Restricting focus to a smaller set of primary care interventions, she showed that reallocating resources from inefficient to efficient interventions would save an additional 600,000 years of life annually for the same level of investment.

This suggests that there is potential for countries below the curve in Figure 2 to move towards the curve by reallocating scarce health resources from areas where they do not produce major benefits to those that do. Indeed, improving the health of populations is one of the most important goals of a health system. Recognizing that resources are

**Table 1**

| INTERVENTION | COST PER DALY (1993 $) |
|---|---|
| DOTS | 3 |
| Tetanus for pregnant women | 2-10 |
| Basic dental care | 5-20 |
| Vit A, 6 months, <5 yrs | <10 |
| Treatment of STDs (HIV prev) | 1-55 |
| Mobile surgery cataract | 20-40 |
| Adding Hep B to existing EPI | 25-50 |
| Maternal and perinatal package | 30-250 |
| Cervical cancer screening | 100 |
| Medical management stable angina | 100-200 |
| Behavioural change CVD | 150 |
| Protein energy mal. e.g feeding | 150-250 |
| IDDM - insulin and education | 240 |
| Antipsychotic for schizophrenia | 250-300 |
| Environmental control dengue | 2200 |
| Management of unstable angina | >5000 |
| Treatment leukemia | 10,000 |
| Treatment CA lung | 12,000 |

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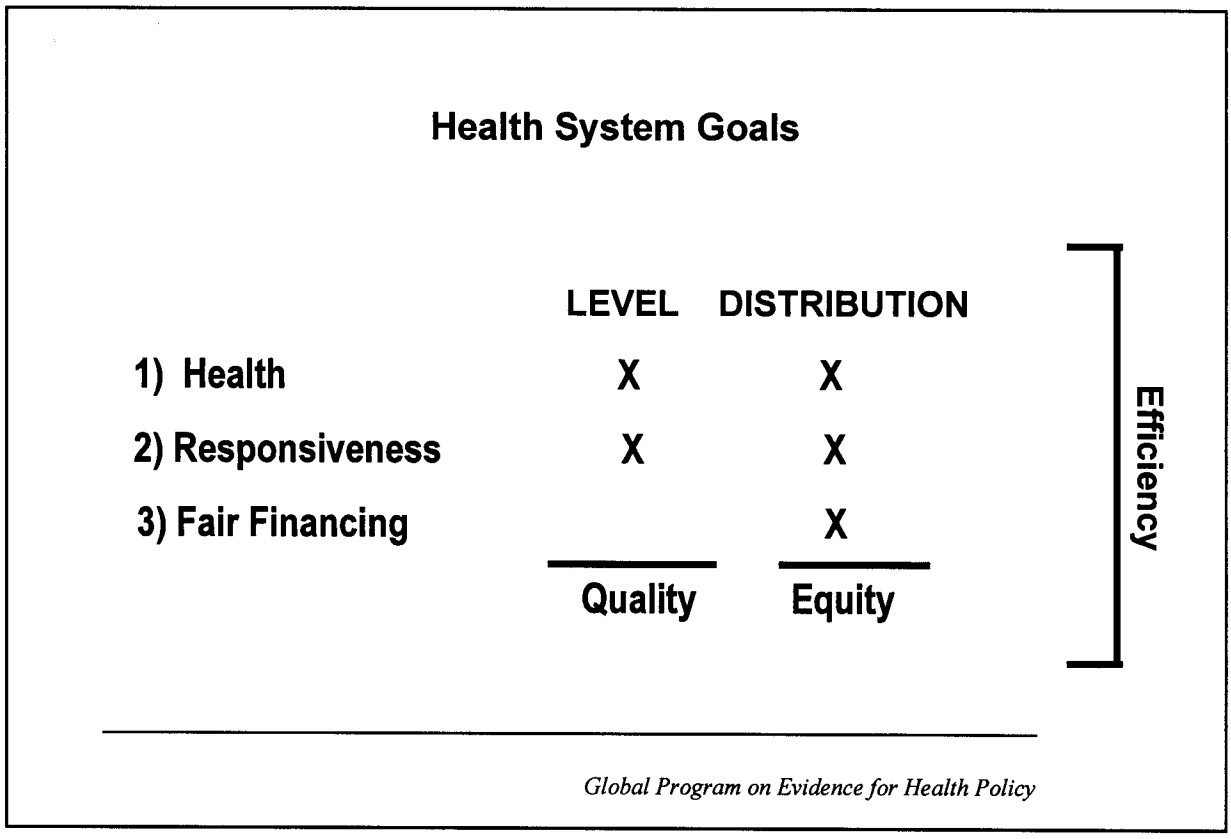
scarce in all countries compared to the possible ways in which health can be improved, policy makers need timely evidence on the probable health impact of using resources in particular ways. Epidemiological information on the major causes of mortality and morbidity in different settings is increasingly available,[6] but timely and consistent information on the effectiveness and costs of interventions, programs and policies is rarely available.

The evidence of Tengs et al. suggests that major benefits can be had from moving from cost-ineffective to cost-effective interventions, a conclusion re-enforced by Murray et al.[7] who used a programming model to argue that a typical country in sub-Saharan Africa could improve health outcomes by 40% simply by reallocating resources to the most cost-effective mix of interventions. But studies such as those of Tengs et al. and Murray et al. are rare, even though the cost-effectiveness literature is increasing rapidly.[8] Most studies focus on a single intervention in a specific setting, often using different methods, and it is difficult for policy makers to know if the results are likely to apply in their setting. Moreover, differences in the availability of resources mean that an intervention that is cost-effective in one setting might not be cost-effective in another.

The only attempt to report the cost-effectiveness of a wide variety of interventions on an international basis was published in 1993, and uses data from 1989 and 1990.[9] Table 1 reports selected results from this collation, again showing that the cost-effectiveness of interventions routinely undertaken varies considerably and that considerable gains might be made by switching resources from inefficient to efficient interventions. However, not only are the calculations somewhat out of date, but they suffer from a number of other problems. First, the methods used differ across the studies. Second, the baseline studies used in the calculations came from a variety of sources, some in developing countries, but most from developed countries. The starting points in terms of the existing infrastructure and other interventions

**Figure 4**



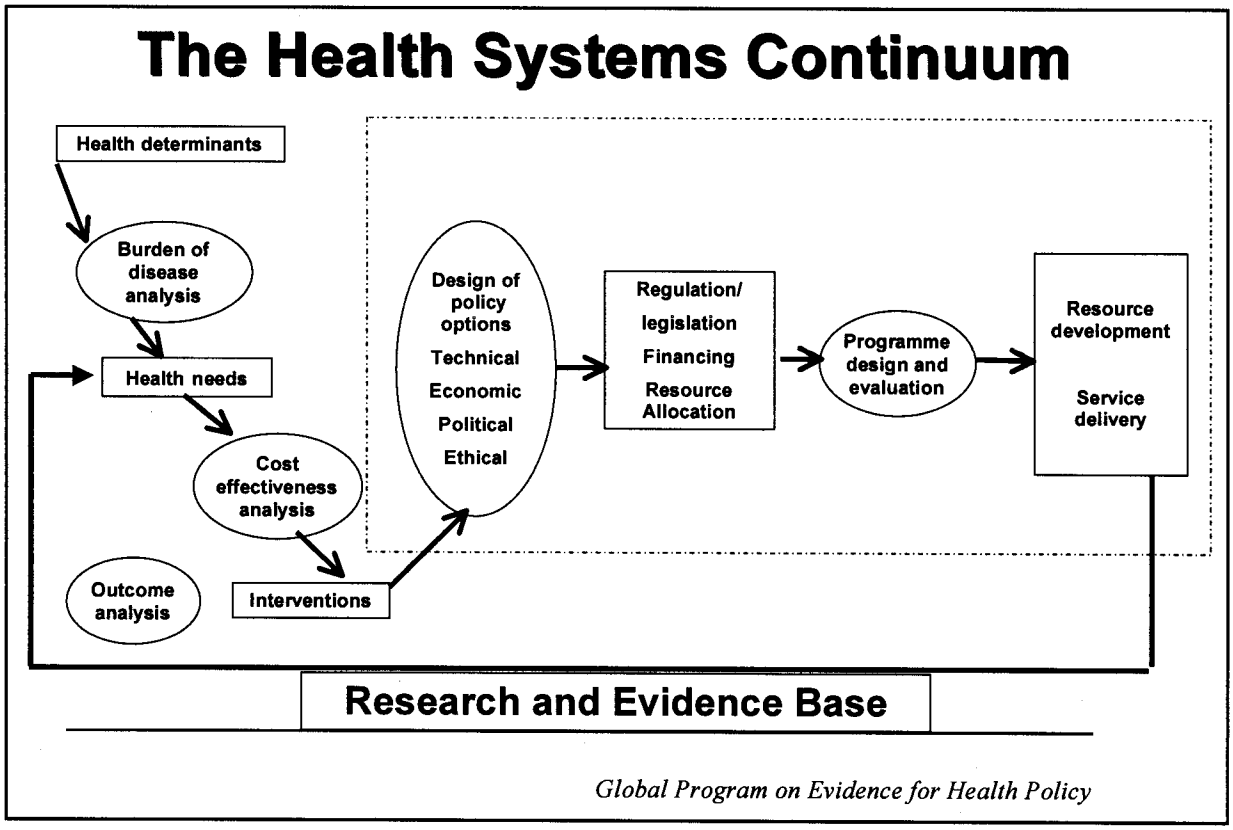

already in place were very different, so it is difficult for policy makers in developing countries to know the extent to which the results apply to them.

The study was important, however, for pointing the way in terms of the evidence that would be useful for policy makers and was a precursor to the work of Tengs et al. But since that time there has been no effort to collate in a user-friendly way cost-effectiveness data that can be used by decision makers in developing countries. This is one of the roles of GPE in WHO, which is in the process of developing a consistent methodology for measuring costs and effectiveness that can be used to ensure comparability of studies. It has developed a way of generalizing the results of studies across settings.[10] Toward the end of 2000 or early in 2001 it plans to have available a database on the cost-effectiveness of a wide variety of interventions at a regional level. This has been chosen as a compromise between the impossibility of producing cost-effectiveness league tables for all of the 191 countries that are members of WHO and the lack of specificity of league tables undertaken at a global level. This database will be regularly updated. In addition, the calculations on which it is based will be made available on the World Wide Web so that analysts can adapt the results to their own setting if they so wish.

## Discussion

Cost-effectiveness information is an important input to the priority setting process at all levels of decision making. Resources are scarce in all settings, and policy makers need to ensure that they are used wisely. However, cost-effectiveness analysis should not be used formulaically, without thought. Indeed, Figure 4 shows that there is more than 1 goal of the health system – improving health levels is important, but it is not the only goal. Policy makers are concerned about the responsiveness of their system to the legitimate demands of the population, to the fairness of financing, and to equity concerns in general.[11]

**Figure 5**




Accordingly, cost-effectiveness information should enter the policy process as one input – an important input, but not the only input – to decision making. When choosing what types of interventions should be provided or encouraged in their setting, policy makers need to have information on the improvement in population health that would result from using resources in particular ways (e.g. cost-effectiveness information). But they will also be concerned with what mix of interventions respond best to the needs of the poor, or how interventions meet people's expectations. This is shown in Figure 5 where information on cost-effectiveness enters the policy process to be weighed against other types of information when allocating scarce health resources.

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